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THE KETOGENIC DIET AND ITS USE[1]

CLIFFORD J. BARBORKA, M.S., M.D., Sc.D.

THE ketogenic diet was first used twelve years ago to note the effects of ketonemia on the course of epilepsy. This diet was used as a possible substitute for the fasting regimen which had previously been shown by Guelpa and Marie and Geyelin to influence epileptic seizures in many cases.

Following the use of the ketogenic diet in epilepsy it was therapeutically applied in cases of migraine. Later Peshkin and Fineman, and recently M. Julesz studied the effects of the ketogenic diet in bronchial asthma. Further application of the ketogenic diet in recent investigations has shown it to be an adjunct in the treatment of certain types of urinary infections. Although much has been learned, and although this method of treatment has brought success in a far higher percentage of cases than was hoped for, many problems are still unsolved and probably will remain so until the cause of these conditions is more fully understood.

Emphasis has been laid on the theory which underlies the ketogenic diet. The diet consists of a large amount of fat, an adequate amount of protein and a minimal amount of carbohydrate. Ketone bodies (acetone, diacetic acid, and beta-oxybutyric acid) are formed as the intermediary products of the incomplete oxidation of fats when the amount of carbohydrate in the diet is limited. In other words, the ketogenic factors, or fatty acid derivatives of foods, overbalance the antiketogenic factors, or glucose derivatives of food. The fact that large amounts of acetone and diacetic acid are excreted in the urine provides a simple means of testing for the presence of these ketone bodies, and of determining if the diet is properly balanced.

The conditions necessary to the utilization of the ketogenic diet are

[1] From the Department of Internal Medicine, Northwestern University Medical School, Chicago, Illinois. Presented before the American Dietetic Association, November 10, 1932.

a simple method of calculation, and the education of the patient in the construction of diets from this calculation. The calculation of a ketogenic diet depends on two principles: first, the total amount of food given must correspond as closely as possible with the total energy requirement of the patient; second, the ketosis, which involves limitation of the quota of carbohydrates in the diet, must be developed and maintained. In the course of work with the ketogenic diet at the Mayo Clinic, I devised a method which, although less exact from the standpoint of the theoretic

TABLE 1

Method of calculation for ketogenic diet

DIET	CARBOHYDRATE, GM.	PROTEIN, GM.	FAT, GM.	PROCEDURE
1	Estimated calories* × 0.02	Adult—$\frac{1}{3}$ to $\frac{1}{2}$ weight** Child—$\frac{2}{3}$ weight	Estimated calories × 0.09	Continue for from one to two days. Intermediate diet prior to production of ketosis, or fast patient for two days and begin Diet 2
2	Estimated calories × 0.015	Adult—$\frac{1}{3}$ to $\frac{1}{2}$ weight Child—$\frac{2}{3}$ weight	Estimated calories × 0.10	Continue for from three to five days, ketosis may develop
3	Estimated calories × 0.010	Adult—$\frac{1}{3}$ to $\frac{1}{2}$ weight Child—$\frac{2}{3}$ weight	Estimated calories × 0.10	
4	Estimated calories × 0.008	Adult—$\frac{1}{3}$ to $\frac{1}{2}$ weight Child—$\frac{2}{3}$ weight	Estimated calories × 0.10	Continue indefinitely. Diets 3 or 4 to be used in order to develop or intensify ketosis if necessary

* Total estimated calories = weight in pounds × 16 for adults; total estimated calories = weight in pounds × 25 for children.

** Protein quota $\frac{1}{3}$ to $\frac{1}{2}$ weight in pounds is determined by patient's individual needs.

relation involved, is sufficiently accurate for clinical work and has the advantage of greater simplicity. I have modified this method as given in table 1.

The resulting diets conform to the theoretic causes of ketosis as developed by Woodyatt and Shaffer. This simple system of calculation cannot be utilized in exact or experimental work, when it is desired to study the relationship of the ketogenic to antiketogenic molecules.

Occasionally the sudden change from the normal diet that is relatively low in fat and high in carbohydrate, on which the average patient lives,

to a diet that is low in carbohydrate and high in fat, may result in nausea or even in vomiting. There will be little difficulty if the change is made gradually, or if the patient fasts for two or three days and then is placed on a diet to maintain ketosis. With the development of ketosis, and the increased excretion of base, some loss of weight may be expected because of the accompanying dehydration. Originally the beneficial effect of the ketogenic diet was thought to be due to the influence of aceto-acetic acid, which behaves pharmacologically as an anesthetic. Keith's experimental evidence, observing the effect of aceto-acetic acid on the convulsions induced by thujone, supports this hypothesis. It has also been suggested that the beneficial effects of the ketogenic diet are due to its effect on the acid-base equilibrium, by correcting an abnormal tendency toward the spontaneous development of alkalosis. It probably has an even more important influence on the balance of the basic elements of the nervous tissue, namely, water and fat; and by some physiochemical reaction, it may alter conductivity, irritability, and permeability of the nerve cell. Lennox and Cobb, in their comprehensive monograph, present many physiologic factors that may precipitate seizures by widespread changes in tissues of the brain; such factors are anoxemia, alkalosis, or edema.

Fay, and later McQuarrie, called attention to the possible influence of fluid and its control in the treatment of epilepsy. It is their belief that the therapeutic benefit of the ketogenic diet is due to the dehydration effect. Byrom was unable to support the dehydration theory. Keith found that extreme dehydration had little influence in preventing experimentally produced convulsions.

Bridge and Iob have presented evidence that neither the ketosis nor the acidosis accompanying the so-called ketogenic treatment for epilepsy can be considered the only beneficial factors of such a regimen. Knowing that sodium represents almost all the base of the extracellular fluids of the body, whereas potassium is the chief base of the tissues, it was possible for them to calculate, with a fair degree of accuracy, the source of the fluid which is lost when the patient is on the diet. Their experiments suggest that if the high fat diet has succeeded in removing a surplus of extracellular tissues from the body, improvement in seizures results. If the diet has not removed this fluid it does not affect the course of the disease.

All three measures that have been brought forth recently, namely, fasting, the ketogenic diet, and rigid restriction of intake of fluid in the treatment of epilepsy, have in common the effect of causing dehydration

of the tissues and a tendency to maintain the hydrogen-ion concentration of the body fluids at a slightly higher level than normally exists. Dehydration alone produces a shift in the acid-base balance, so that the tendency is toward greater acidity of the tissues. This intimate relationship of the acid-base balance and the water balance makes it difficult to ascertain which is of primary importance as far as the occurrence of seizures is concerned.

The ketogenic diet was first utilized in treating epilepsy. The results of such treatment in the last ten years show that the symptoms of about thirty to thirty-five per cent of the patients who follow the diet carefully and accurately for a period of six months to a year are controlled; the condition of another thirty-five to forty per cent of the patients are definitely improved; about thirty to forty per cent of the patients derive no benefit. There seems to be no question but that the best results are obtained in the treatment of children and young adults who are just beginning to have seizures, before the convulsive reaction has become a habit. Older patients or those who have had frequent attacks for years, especially with resultant mental deterioration, are the least likely to be benefited.

I feel that an adequate period of observation of the effects of the diet alone in cases of epilepsy has elapsed and that now it is possible to judge approximately the results that can be expected. I believe that the best regimen today for the patient who has epilepsy should incorporate: (1) the drug of choice, phenobarbital (luminal); (2) the ketogenic diet, employed either from the qualitative or the quantitative standpoint, as the case may necessitate; and (3) restriction of the intake of fluid to 20 ounces (600 cc.) or less every twenty-four hours.

Because so many physicians have noticed the close relationship between epilepsy and migraine, I tried the ketogenic diet early in my experience with it, in the treatment of migraine. Certain observers believe that these conditions are due to the same etiologic factors, expressed in a different manner, namely, that attacks of migraine are sensory seizures, whereas epilepsy is a motor seizure. However there are very few cases in which epilepsy coincides with migraine. Migraine is a rather common syndrome and it is not surprising that a certain number of patients who have epilepsy should also have migraine.

Since the first report which I made from the Mayo Clinic, Schnabel has reported his experience with the ketogenic diet in cases of migraine. Lennox and Cobb, in their monograph on epilepsy, state that it would be of interest to know whether the induction of acidosis would be of

benefit in cases of migraine. It has been suggested that change in the acid-base equilibrium is a factor associated with migraine, since patients with migraine are benefited by fasting with its accompanying acidosis of starvation. Weissman-Netter and Weissman-Netter found apparent changes in the acid-base balance in migraine; the hydrogen-ion concentration and alkaline reserve were normal in the periods of freedom from attacks, but a tendency to alkalosis developed about forty-eight hours prior to an attack. The recent method of studying acid-base equilibrium by hypernea or overventilation of the lung, which induces alkalosis, was utilized by Muck who produced hemicranial attacks by this means in cases in which patients were subject to migraine.

Many physicians have considered migraine from the standpoint of allergic manifestation. They have advocated various forms of treatment, from the use of peptone and restriction of the intake of protein to the use of so-called "elimination diets." Many patients themselves restrict intake of carbohydrates, proteins, or fats after they have found that overindulgence in one of the three elements of food stuffs has been followed by a sick headache. Of these three food stuffs, overindulgence in carbohydrates is the most likely to precipitate an attack.

Another theory takes account of dysfunction of the liver and duodenum. The French especially refer to "duodenal migraine." Attention has been called to the evidence of disturbed hepatic function in cases of migraine as estimated by the van den Bergh reaction and retention of bilirubin. The condition of many patients has been improved by intraduodenal administration of magnesium sulphate to stimulate the flow of bile. With these facts in mind, it can readily be seen that the use of the ketogenic diet in migraine is not without logic, for it potentially could meet, in a therapeutic manner, all three of the foregoing suggestions at the same time. If alkalosis induces migraine, the ketogenic diet, which produces ketosis, with accompanying decrease in the irritability of the nerves, might be an additional factor which would inhibit attacks. From the standpoint of an allergic manifestation, because the content of protein in the diet may be low, it is possible that there is a chance withdrawal of the specific protein element. Intake of carbohydrate, of course, is markedly restricted. Boyden has shown that a diet high in fat promotes biliary drainage. It has been demonstrated also that duodenal motility occurs after ingestion of fat. Therefore, we would expect benefit in cases due to dysfunction of the liver of duodenum.

In the last five years I have used the ketogenic diet quantitatively in the unusually severe and frequent attacks of migraine. In at least

TABLE 2

A ketogenic diet—quantitatively and qualitatively

CARBOHYDRATE 25, PROTEIN 50, FAT 240, CALORIES 2460			SUGGESTED DISTRIBUTION OF FOOD FOR ONE DAY		
Food	Gram weight	Household measure	Food	Household measure	Gram weight
Cereal			*Breakfast:*		
Bread			Fruit, 5%	½ serving	50
Muffin, soy bean	75	3 muffins	Bacon	4 slices	20
Butter	100	10 squares	Egg	1	50
Salad dressing with oil	30	2 tablespoons	Muffin, soy bean	1	25
Milk			Butter	2 squares	20
Cream, 20%			Cream	¼ cup	60
Cream, 40%	180	¾ cup			
Meat, lean	60	1 serving (2 ounces)	*Dinner:*		
Bacon	20	4 slices	Meat	1 serving	60
Eggs	100	2 eggs	Vegetable, 3%	1 serving	75
Vegetables, 3%	300	4 servings	Salad: Fresh vegetable, 3%	1 serving	75
Vegetables, 6%			Salad dressing with oil	1 tablespoon	15
Fruit, 5%	150	1½ servings	Muffin, soy bean	1	25
Fruit, 10%			Butter	4 squares	40
Vegetables and fruit, 15%			Cream	¼ cup	60
Vegetables and fruit, 20%			Fruit, 5%	½ serving	50
			Supper:		
			Egg or egg substitute		
			Vegetable, 3%	1 serving	75
			Salad, vegetable, 3%	1 serving	75
			Salad dressing with oil	1 tablespoon	15
			Muffin, soy bean	1	25
			Butter	4 squares	40
			Cream	¼ cup	60
			Fruit, 5%	½ serving	50

Approximate mineral content: Calcium *.485*, Phosphorus *.745*, Iron *.0105*.

thirty per cent of the cases the migraine has been controlled; in fifty per cent the frequency and severity of the attacks have been definitely lessened; and in something like twenty per cent there has not been any improvement.

In cases of migraine in which the attacks have been less frequent and less severe, or in which the economic situation and environment have prevented accurate application of the regimen, I have used a rough approximation to the ketogenic diet qualitatively. In table 2 is shown how a quantitative ketogenic diet may be applied qualitatively.

Thus far qualitative measures have resulted in control in twenty per cent of patients; another fifty-six per cent have been definitely benefited, and about twenty-three per cent have derived no benefit. Tiefensee has advocated acid diet for bronchial asthma. In Peshkin's and Fineman's studies of the effects of the ketogenic diet on asthma of children, they chose cases of chronic asthma, which proved refractory to various modern forms of treatment. The diet alone was efficacious in these cases to the extent that the chronic asthmatic state usually was controlled or entirely cured, at least long enough to permit the patients to become adjusted. The control of asthma or the relief from it following the treatment with a ketogenic diet exclusively, is possibly brought about by some mechanism which involves the physiochemical change in the cell and blood of the patient, thereby restoring the allergic balance partially or completely. Beckman has recently called attention to the possible association of allergy and acid-base balance. I have seen definite improvement in a few cases of asthma in adults, although I question, as yet, the justification for its general use.

In reviewing the literature we find that many attempts have been made to free the urinary tract of the colon bacillus infection. Efforts to change the urine from an alkaline to an acid reaction, and vice versa, have been made with the hope that in the changed medium the growth of the organism would be inhibited. However it is doubtful if the urine, in such procedures, is ever entirely free of the living organism.

From work done by Shohl and Janney, it is known that colon bacillus is inhibited if the acidity or alkalinity of the urine is increased beyond a certain point (pH 4.6 to 5, acid, and at a pH 9.2 to 9.6, alkaline). The optimal growth of the bacilli takes place at pH 6 to 7; this is the average reaction of the urine of a person who is on a mixed diet. In a series of experiments on the relationship of the pH of the culture medium and the growth of the colon bacillus, W. M. Clark found that the urine may become free of organisms as determined by culture at a higher pH than 4.6 to 5, because the urine is a highly buffered medium.

In searching still further for means of acidifying the urine and inhibiting the growth of the colon bacillus, I suggested the ketogenic diet. A. L. Clark found and reported the favorable results of cases who were suffering from recurrent bacilluria of the bacillus coli type. These cases were free from the bacteria and pus in the urine, and in growth on culture, within seven to thirty-five days from the beginning of the ketogenic diet. Helmholz was forced to the conclusion, from his wide experience with former therapeutic results in the Mayo Clinic, that urinary infection in the presence of anomalies could not be cleared up by any form of medical treatment, yet the first two cases with anomalies of the urinary tract that were not benefited from any procedure of therapy were rapidly cured of urinary infection by means of the ketogenic diet. Hugh Cabot has discussed the treatment of infections of the urinary tract by the ketogenic diet and has called attention to its possible value in the preparation of patients for operation on the urinary tract as well as in their postoperative treatment. It is possible that the urine of patients in ketosis may contain substances that have a bactericidal action independent of their acidity. The application of the ketogenic diet to urinary infections opens up a new field of use that may offer much to the patient.

An interesting observation experienced by patients who are receiving the ketogenic diet is their comparative freedom from common acute infections, such as measles and scarlet fever. It must be more than a coincidence that patients on the diet will be resistant to common colds when all the other members of a family are having infections. This, of course, may be due to the high vitamin A content of the diet. Wolbach and Howe, of Harvard University, have made extensive investigations on laboratory animals, and at present it seems justifiable to conclude, from their work, that in man and rats the normal epithelium of the respiratory, the alimentary and the genito-urinary tracts, the eye and the paraocular glands, is desquamated and replaced by keratinized epithelium, as one pathologic manifestation of vitamin A deficiency. There seemingly is a simultaneous occurrence of infection along with the epithelial injury; if infection does appear in cases of vitamin A deficiency it is really secondary to the derangement of the epithelium. Thus the anti-infective factor that vitamin A seems to confer is probably due to its maintenance of intact, healthy epithelial membranes, particularly in the upper part of the respiratory tract. Hence the high vitamin A content of a ketogenic diet tends to preserve one of the first lines of defense against invasion of bacteria.

Since the use of the diet must perhaps be continued throughout a

long period, it is extremely important to guard against the possible evil effects of any kind of deficiency in diet. Adequate calories, protein, minerals, and vitamins must be provided for maintenance of the adult and for growth of the child. Although studies thus far have not revealed definite evidence of harmful effects from the diet, certain observations have been made that are worthy of attention. A few patients on the ketogenic diet have been reported to have pellagra, but they have responded immediately to the administration of vitamin B_2 (vitamin G). Because of the possible lack of adequate vitamin B in the diet, from half to a teaspoonful of brewer's yeast is added daily.

Early in the use of the diet, about thirty to thirty-five per cent of the women treated ceased to menstruate. It has been shown that there is definite inhibition of the estrual cycle in rats which are on diets deficient in vitamin B. In the last five years, since we have used brewer's yeast as a routine, we have not had one case of cessation of menstruation on the ketogenic diet.

Another possible application of a ketogenic type of diet is called to attention by the experimental work of Craven who has shown that a diet high in fat provides maximal protection against the hepatic injury caused by arsphenamine.

In applying the ketogenic diet and observing the results, emphasis should be placed on the variability in the absorption and assimilation of a high intake of fat, as well as fluctuations in the degree of ketosis, of different persons.

The present status of the ketogenic diet is not that of a specific therapeutic measure or cure, but rather that of a new and uncertain form of treatment which is as yet in the experimental stage. Even though the diet may act physiologically in a manner that will prove to be of therapeutic value in a number of conditions, I would emphasize the fact that this diet is not a cure-all but that it has been used with enough success, for a sufficient length of time, to justify its classification among important new methods of treatment.

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CALCIUM AND PHOSPHORUS METABOLISM OF NORMAL PRE-SCHOOL CHILDREN: I. ON DIETS CONTAINING PLAIN AND IRRADIATED CEREALS[1]

THELMA PORTER-LEVIN

AT THE time when interest in the use of irradiated cereals as a source of vitamin D was first aroused, two experiments were carried out to study the effect of these foods on the metabolism of calcium and phosphorus by normal pre-school children. These investigations were made in Chicago during the winter months (December to March) when the ultraviolet rays in the sunlight of the city are low. The subjects were two healthy, well-developed children, a boy four, and a girl two and one-half years old.

In the first experiment short tests were conducted according to the following calendar:

a. A 5-day preliminary period on *non-irradiated* cereal diet
b. A 5-day test period on *non-irradiated* cereal diet
c. A 5-day test period on *irradiated* cereal diet
d. A 5-day test period on *irradiated* cereal diet

This schedule of feeding was repeated three times.

The basal diet, kept the same each day, included those foods to which the children were accustomed, served in weighed portions; but the food was taken *ad libitum* except for milk (450 gms. per day) and cereals (approximately 10 per cent of the dry weight of the diet per day). This diet furnished an average of 1250 calories per day and was adequate in all respects except that it was low in calcium and vitamin D. These two constituents were restricted in order that any calcifying effect of the activated cereals might be easily detected.

During the experimental feeding the children were in their own home with the usual individuals in charge so that there was no disturbance in environment or discipline. Nine calcium and phosphorus balances were determined on each child. The methods of collections and analyses were essentially the same as described in other studies (1 and 2) of this type. Aliquot samples of the weighed food-intake, and all of the urine and feces excreted, were made into five-day composites for analysis. Food and feces were dried to a constant weight at 80°C. and ground

[1] From the Nutrition Laboratory of the Department of Home Economics of The University of Chicago. The expense of this research was defrayed by a grant from the Quaker Oats Company, Chicago.

TABLE 1

Average calcium and phosphorus storage of four-year-old boy (weight 16.5 kg.), in grams per kilo per day

EXPERIMENT I	OATMEAL		CALCIUM			PHOSPHORUS		
	Kind	Per cent dry diet	Intake	Output	Retention	Intake	Output	Retention
A 1*	Plain	(preliminary period)						
2	Plain	10	0.043	0.031	0.012	0.051	0.039	0.012
3	Irradiated	12	0.045	0.032	0.013	0.051	0.044	0.007
4	Irradiated	10	0.046	0.034	0.012	0.053	0.041	0.012
B 1	Plain	(preliminary period)						
2	Plain	11	0.047	0.033	0.014	0.048	0.040	0.008
3	Irradiated	13	0.033	0.032	0.001	0.045	0.043	0.002
4	Irradiated	11	0.043	0.029	0.014	0.047	0.039	0.008
C 1	Plain	(preliminary period)						
2	Plain	14	0.034	0.027	0.007	0.047	0.027	0.020
3	Irradiated	14	0.040	0.030	0.010	0.048	0.021	0.027
4	Irradiated	12	0.036	0.025	0.011	0.049	0.028	0.021

* All periods were five days long.

TABLE 2

Average calcium and phosphorus storage of two-year-old girl (weight 15.0 kg.), in grams per kilo per day

EXPERIMENT I	OATMEAL		CALCIUM			PHOSPHORUS		
	Kind	Per cent dry diet	Intake	Output	Retention	Intake	Output	Retention
A 1*	Plain	(preliminary period)						
2	Plain	10	0.043	0.036	0.007	0.047	0.038	0.009
3	Irradiated	11	0.041	0.033	0.008	0.050	0.037	0.013
4	Irradiated	10	0.045	0.035	0.010	0.049	0.040	0.009
B 1	Plain	(preliminary period)						
2	Plain	8	0.039	0.031	0.008	0.045	0.036	0.009
3	Irradiated	9	0.038	0.029	0.009	0.043	0.034	0.009
4	Irradiated	9	0.040	0.036	0.004	0.041	0.029	0.012
C 1	Plain	(preliminary period)						
2	Plain	11	0.040	0.029	0.011	0.048	0.030	0.018
3	Irradiated	12	0.043	0.039	0.004	0.052	0.034	0.018
4	Irradiated	11	0.043	0.029	0.014	0.050	0.027	0.023

* All periods were five days long.

finely before being ashed. The calcium was determined in the urine directly, and in the food and feces when dry-ashed at 450°–500°C. by the McCrudden method (4) with the control of the hydrogen-ion concen-

tration for the precipitation of calcium oxalate suggested by Shohl (6). The phosphorus determinations were made according to the double precipitation method of McCandless and Burton (3) on samples which had been digested with sulphuric and nitric acids. All figures in a mineral balance are the average of three analyses which agreed within 2 per cent.

Tables 1 and 2 show the kind and amount of cereal incorporated in the basal diet during each period, and the calcium and phosphorus balances for each subject.

An examination of the balances shows that the mineral intakes varied slightly from period to period, but the retentions fluctuated markedly with no consistent relation to intake or to the introduction of irradiated food containing vitamin D. The retentions of calcium and phosphorus per kilogram of body weight were found to be near the "average" level for subjects of these ages, according to the findings of Sherman and Hawley (5) on normal children, but showed no true differences in favor of the irradiated cereal as a source of vitamin D.

SECOND EXPERIMENT

Because of the conviction that longer dietary periods would have given the body a better opportunity for adjustment to changes in intake and therefore would have given more clear-cut results, a second series of experiments was conducted the following winter on the same subjects. A plan of feeding was carried out as follows:

Period I. Non-irradiated cereals (48 days)

	days
a. Basal diet	15
Test	5
b. Basal diet	23
Test	5
Total	48

Period II. Irradiated cereals (39 days)

a. Basal diet	14
Test	5
b. Basal diet	15
Test	5
Total	39

The total of both periods was 87 days.

The purpose of the foregoing experimental calendar was to allow the ingestion of a basal diet containing one or the other type of cereal over a

much longer time than is usually considered necessary. The diet was taken *ad libitum* during the preliminary and intermediate periods, except for milk, butter, and cereal which were kept constant. In the collection periods all food items were served in weighed portions and were kept constant from day to day in a given period.

A child's ordinary mixed diet containing either plain or irradiated cereals was used during the entire eighty-seven days of experimental feeding. It was adequate in all the essential nutrients except that it was rather low in calcium and vitamin D. The average daily caloric intake was between 1250 and 1300, with protein furnishing 11 per cent, fat 31 per cent, and carbohydrate 57 per cent of this energy. The cereals[2] fed each day amounted to an average of 20 per cent of the calories or 26 per cent of the dry weight of the diet. Four calcium and phosphorus balances were determined on each child and are given in tables 3 and 4. The methods of collection and analyses were the same as used in the first study.

A glance at tables 3 and 4 shows higher retentions of calcium and phosphorus for both subjects during the periods when irradiated cereals were incorporated in the diet. If the average mineral retentions on the two diets are compared, the differences appear at first to be significantly in favor of the periods when activated cereals were used. The average retentions per kilo of body weight were 0.004 gm. and 0.007 gm. per day on plain cereals, and 0.013 gm. and 0.010 gm. per day on irradiated cereals, for calcium and phosphorus respectively. An inspection of the individual balances, however, shows that the variations from period to period, regardless of the cereal used, are as great as the average increases observed on treated cereals. Furthermore the high retentions (0.018 and 0.014 gm. Ca; 0.013 and 0.012 gm. P) obtained in the first balances

[2] The vitamin D potency of the irradiated cereals used in the diet was evaluated by Dr. F. L. Gunderson of the Quaker Oats Company Nutrition Laboratory by means of thirty-five day feeding tests on groups of standard rats. These determinations indicate that the irradiated cereals possessed some calcifying properties.

Increases in per cent ash of rat femurs corresponding to increases in per cent irradiated cereal as it replaces non-irradiated cereal in rat ration

KIND OF CEREAL	PER CENT ASH IN FEMURS OF 4 RATS AFTER 35 DAYS ON TEST DIET			
	0.0 per cent irradiated cereal	9.5 per cent irradiated cereal	19.0 per cent irradiated cereal	76 per cent irradiated cereal
Oatmeal	36.9	43.6	49.9	54.8
Farina	41.7	43.8	50.5	50.5

TABLE 3

Average calcium storage of children during the last five days of a twenty-day period on a diet containing plain or irradiated cereals, in grams per kilo per day

SUBJECT				CEREAL		CALCIUM			
Sex	Age		Weight	Kind	Per cent dry diet	Intake per kilogram	Output per kilogram	Retention	
	Years	Months						Per kilogram	Per cent of intake
			kg.			*gm.*	*gm.*	*gm.*	
Boy	5	2	18.5	Non-irradiated	24	0.039	0.035	0.004	10
Boy	5	3	18.4	Non-irradiated	31	0.039	0.037	0.002	5
Girl	3	6	17.7	Non-irradiated	23	0.042	0.039	0.003	7
Girl	3	7	17.3	Non-irradiated	32	0.041	0.036	0.005	12
Average.....			18.0	Non-irradiated	28	0.040	0.036	0.004	9
Boy	5	4	18.9	Irradiated	27	0.046	0.028	0.018	39
Boy	5	5	19.1	Irradiated	25	0.037	0.028	0.009	24
Girl	3	8	17.7	Irradiated	29	0.045	0.031	0.014	31
Girl	3	9	17.9	Irradiated	24	0.042	0.033	0.009	21
Average.....			18.4	Irradiated	26	0.042	0.027	0.013	29

TABLE 4

Average phosphorus storage of children during the last five days of a twenty-day period on diets containing plain or irradiated cereals, in grams per kilo per day

SUBJECT				CEREAL		CALCIUM			
Sex	Age		Weight	Kind	Per cent dry diet	Intake per kilogram	Output per kilogram	Retention	
	Year	Months						Per kilogram	Per cent of intake
			kg.			*gm.*	*gm.*	*gm.*	
Boy	5	2	18.5	Non-irradiated	24	0.052	0.044	0.008	15
Boy	5	3	18.4	Non-irradiated	31	0.048	0.045	0.003	6
Girl	3	6	17.7	Non-irradiated	23	0.055	0.045	0.010	18
Girl	3	7	17.3	Non-irradiated	32	0.048	0.042	0.006	12
Average.....			18.0	Non-irradiated	28	0.051	0.044	0.007	13
Boy	5	4	18.9	Irradiated	27	0.049	0.036	0.013	27
Boy	5	5	19.1	Irradiated	25	0.044	0.039	0.005	11
Girl	3	8	17.7	Irradiated	29	0.052	0.040	0.012	23
Girl	3	9	17.9	Irradiated	24	0.048	0.037	0.011	23
Average.....			18.4	Irradiated	26	0.048	0.038	0.010	21

following the introduction of irradiated cereals are not maintained until the next test period fifteen days later. These last balances were considerably lower, although the irradiated cereals were still being ingested.

These observations at once raise the questions as to what changes in the level of storage there may have been between these 'sampling' periods, and what factors caused the variations from period to period. While the first impulse is to conclude that the mineral storage was improved during the feeding of the treated cereals, more careful study of the findings, with due consideration of their fluctuations, leads to the realization that this may not be justified. Although the change in the type of cereal in the diet was the only variable known, the fluctuations in the results may have been accentuated by unknown and uncontrollable influences on the mineral metabolism of these human subjects, or may merely indicate the 'normal' variations in mineral storage. Further, since the balances were not continuous in their measurement of the changes occurring in the bodies of the children, it is impossible to determine the extreme ranges of variation in mineral storage which may have occurred.

Therefore in spite of the fact that in this second experiment some increases in mineral retentions were observed during the feeding of the irradiated cereals, and that these changes are of the same order of magnitude as differences commonly reported as significant, it was felt that the interpretation of the results should be withheld until the mineral metabolism of children had been studied continuously over a considerable period of time; some understanding of the extent of 'normal' variation would then be available. It was the need for data on this question that led to the experiment to be reported later. As will be seen in the light of those results, the significance of the findings on the two types of cereal diets can not be determined until the effects of such diets have been tested during longer, successive balance studies.

SUMMARY

Two normal pre-school children were fed controlled mixed diets, furnishing approximately 50 mg. each of calcium and phosphorus per kilo per day, and containing either plain or irradiated cereals. Twenty-six calcium and phosphorus balances were determined. In the first study employing short dietary periods, the mineral retentions showed no improvement in favor of the irradiated cereal diet. In the second study, when longer periods on a given diet were sampled by five-day balances, the average retentions per kilo per day were 0.004 gm. and 0.007 gm.

on plain cereals, and 0.013 gm. and 0.010 gm. on irradiated cereals for calcium and phosphorus respectively.

While the differences in average mineral retentions in this last experiment appear to show increases in favor of the balances when irradiated cereals were fed, the variations of 1 to 9 mg. from period to period, regardless of the diet, are as great as the average increases of 3 to 8 mg. observed on treated cereals. The explanation of the prevalance of retention variations throughout the study is not clearly understood, especially when the only known variable in the exacting management of the subjects was the change in the cereal of the basal diet. Therefore it appears that conclusions regarding the significance of these findings should be withheld until the effects of two types of cereal on mineral storage can be determined over longer periods by means of continuous balances. The difficulty of interpreting the results points to the need for the study of successive mineral balances in children in order that the extent of the 'normal' or expected variations in mineral storage may be understood. Such a study will be reported in a following paper.

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BELIEF IN MAGIC[1]

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TO THE mystical Vale of Avalon, made a part of the poetry of our lives by Tennyson's *Idylls of the King*, came in A.D. 61, according to tradition, Joseph of Arimathea, bearing the Holy Grail, to preach the gospel in England. In a green meadow on what was then an island crowned by a high, rounded hill he planted his staff. It took root and grew and became a thorn tree. For ages since then, men have gone from the ends of the earth to pluck a sprig of this Holy Thorn that it might be buried with them and insure their welfare in the land beyond the grave; or have traveled to spend their last days beneath the sacred tree and be buried in its shade. Here, too, the remains of Joseph of Arimathea became famous for their wonderful cures, and pilgrims to his shrine brought gifts till the riches of Glastonbury Abbey exceeded those of many kings. On wonder-working relics the success of every ancient abbey depended.

Today on a high hill overlooking the Hudson River a new church in cathedral form has been erected. Its leader is drawing pilgrims from far and near, not to experience marvelous cures from the touch of sacred relics, but to learn how to acquire a "sound mind," which "takes into full account the law-abiding nature of the world." "The adhesive power of magical ideas," says Dr. Harry Emerson Fosdick, "is prodigious, and millions of people in the modern world still retain a magical faith." But this modern prophet warns, "Don't fool yourself; this is a law-abiding world."

Astronomy came out of astrology, but there still be those who believe in magical connections between human life and the stars. A modern astrologer is said to have had an income from clients of $50,000 per year. Chemistry came out of alchemy, and today the wonders of modern science are so startling that those who do not understand them regard them as magic. Dr. Morris Fishbein, in presenting his book *Shattering Health Superstitions*, remarks how "a craving for the mysterious seems to dominate reason save in rare individuals." Note how the public gloats over the "mystery" of the vitamins and is loath to believe that they may actually be visible in crystalline forms, tangible, measurable, and subject to ordinary chemical analysis.

[1] An address at the annual dinner, American Dietetic Association, November 7, 1932.

In the *Science News Letter* for October 29, 1932, the president of the New Mexico State Teachers College, interested in finding out the prevalence of magical thinking among the parents of elementary school pupils in cities in fourteen states, east, west, north and south, is quoted as concluding that fifty-nine per cent of the population and thirty-two per cent of teachers believe that eating fish improves the brain. One is impelled to quote Mark Twain who replied to a young author's question as to whether there were justification for a statement (attributed rightly or wrongly to the great naturalist Agassiz) that fishermen are more intelligent than farmers because they eat so much fish: "Yes, Agassiz does recommend authors to eat fish, because the phosphorus in it makes brains. So far you are correct. But I can not help you to a decision about the amount you need to eat—at least, not with certainty. If the specimen composition you send is about your fair usual average, I should judge that perhaps a couple of whales would be all you want for the present. Not the largest kind, but simply good, middling-sized whales."

We do not now attribute typhoid fever to an enraged deity bent on punishing a fault, nor think insanity caused by an evil spirit out for vengeance. But the fact of spontaneous recovery and the power of suggestion do give credence at times to the claims of unscientific healers, and some insistence that life can best be studied by exact and quantitative experimental evidence seems to be necessary for most of us. Professor A. V. Hill of London, speaking at the celebration of recent medical progress at the University of Pennsylvania said: "For some years I was responsible for teaching physiology to medical students; and I frequently asked myself—or they asked me—what was the good of teaching them this and that? Why should they learn about frog's muscles and nerves, about the electrical change of the heart, about membrane potentials, and hydrogen ion concentrations? Why should they be forced to study mechanics and to pass an examination in physics? Most of them would have no use for these things in after life; a little more personal skill in handling patients might serve them and the patients better. One answer, I think, is this: they must be made to feel what I have called the physical reasonableness of life. A belief in magic is still widespread; who among us is quite free from it? And we do not want to be quite free. The common folk are all too ready to trust in the magical power of medicine or of treatment and to think of doctors as wizards or magicians. It is fatally easy to believe what it is convenient to believe, and the education of a medical man should lead him to the

instinctive and confident view that magic has no place in medicine, that it is professionally dishonorable to believe, or to suggest, explanations or phenomena or methods of treatment which are physically unreasonable."

But education, medical and otherwise, does not always achieve the desired goal. A man graduated from a well-known school of medicine and hence privileged to inscribe M.D. after his name, has written a book full of quackery which has claimed the attention of great numbers of intelligent folk. One can scarcely see how it is, that after reading a few pages the utter disregard of a "law-abiding world" made real to us by science is not apparent to them. Verily, "it is not always the ignorant who fall for the weirdest forms of quackery." This man, who is the director of a widely-advertised sanatorium, makes all the struggles we have had in this country for first class medical education seem quite unnecessary. He says: "This is what disease really is, a progressive acid saturation, a deficient drainage, an inability of the body to keep as clean inside as it should, and what can we do about this except to quit fouling the fount at its source?" However, why should we bother, really, as to "acid saturation," or "drainage" or all the rest of it, since on another page we are assured that "if we allowed each acute illness to run its course unmolested we would find that spontaneous recoveries are the rule, not the exception, and that to recover from any disease of acute character is but to cease causing it." Just how not to cause it appears less simple, however, when we are told that "all disease is made up of deficiencies and plethoras, and we may be at one and the same time suffering from too much and not enough." Nevertheless, in the last analysis, "all disease is in a sense catarrh or an evidence that the body is seeking through the mucous membrane to extrude toxins, and these toxins are from the carbon family whose sole source is carbon foods." Are not these words sufficient to the wise?

The late eminent biologist and educator, David Starr Jordan, had a word for this sort of "pseudo-dietetic inspiration"—he called it "Sciosophy." This he describes as systematized ignorance, "the most delightful science in the world, because it is acquired without labor or pains and keeps the mind from melancholy." Sciosophy in action is called magic. It recognizes no relation of cause and effect, it needs no instruments of precision, "it brings no contact of the soul with vulgar matter." The field of dietetics is today a specially happy hunting ground for the sciosophist. The mysteries of vitamins, the specificities of minerals, the inequalities of proteins, the shortcomings of calories, the

intricacies of biological equilibrium, lend themselves to sciosophical interpretations which sound like gospel to the man in the street; and if they extract a little money from him, so much the better. "The patient [says one of these apostles of sciosophy] who is able to pay for being healed is *more apt to recover than he who withholds a slight equivalent for health.*"

One of the simplest, most obvious sciosophies is that one can reduce the amount of food he needs by the simple process of thorough mastication. This is too laborious to be a very fashionable doctrine, but once upon a time a gentleman named Horace Fletcher thought he had evolved out of his own inner consciousness the A.B.C. of nutrition, and went as an apostle to Professor Chittenden, then in charge of Physiological Chemistry at Yale (and the father of physiological chemistry in America), offering himself as a subject of experimentation to demonstrate his theories. Mr. Fletcher was persuaded to have his energy metabolism tested in a respiration calorimeter and was quite crestfallen to find that he behaved just like anybody else, a law-abiding person in a law-abiding world.

Today one may safely recommend what Samuel McChord Crothers once styled "a Cheerful Compromise":

> "Life has its inevitable compromises. We cannot always be at our best. Take such a simple matter as that of masticating our food. Before I had given much thought to it, I should have said that it was something worth doing and worth doing well. When I learned that Mr. Gladstone was accustomed to chew each morsel of food thirty-two times, I thought it greatly to his credit. For a man who had so many other things to do, that seemed enough.
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> "But when I read a book of some three hundred pages containing the whole duty of man in regard to chewing, I was disheartened. Mr. Gladstone appeared to be a mere tyro guilty of bolting his food. 'The author has found that one-fifth of the midway section of the garden young onion, sometimes called shallot, has required seven hundred and twenty-two mastications before disappearing through involuntary swallowing.'
>
> "The author evidently did his whole duty by that young onion, and yet I should have pardoned him if he had done something less. That doctrine of his about involuntary swallowing being the only kind that is morally justifiable, seems to me to be too austere. If we have to swallow in the end, why not show a cheerful willingness?"

It is undoubtedly a good safeguard for the organism that the stomach is sensitive and reacts vigorously against too much abuse. Very few men as yet utilize the knowledge which we now have concerning the maintenance of good health in the alimentary tract, and consequently

there is a great deal of "misery of the stomach." The sufferers do not want to think about definite causes and inevitable effects; they want "authority, a pillar to lean against and sympathy, a bosom to weep into." Both of these sciosophy is only too willing to furnish. He who talks about "foods that explode in the stomach" will be heard. Harken to this: "The heavy user of starches or sugars, if he combines these with either acid fruits or with meat or eggs, can get up a very sizable jag from the alcohol generated in stomach and intestine." And again: "Soups to be harmless must contain neither thickening nor meat stocks as the thickening places the soup in the class with starchy foods, and the meat stock *places it in the protein class*. . . . Even if these two dissimilar classes were not incompatible in the digestive tract, yet the introduction of either thickening or stock makes of soup something to be digested, *which it should not be*." "In America we have always combined these very incompatible foods, the concentrated protein group with the starchy or sweet foods, the carbohydrate group which require alkaline conditions throughout for their digestion while the concentrated protein group requires the presence of hydrochloric acid for the first step in stomach digestion, so guarantees inhibition of the carbohydrate digestion always." The practical difficulty that "our daily bread and our daily potatoes" happen each to be a protein-starch mixture of about the same proportions in many a well-assorted diet is serenely ignored as are also the facts that starch digestion can proceed in a medium practically neutral, and that protein chemically combines with acid so that it is no longer free. Facts are too hampering. One is reminded of something Dr. Walter B. Cannon said at the celebration in honor of his twenty-fifth anniversary as professor of physiology in the Harvard Medical School. Paying generous tribute to the inspiration and help received throughout the years from his many distinguished colleagues, he humorously concluded, "Folin has given me aid innumerable times by suavely and coldly disposing of a very beautiful physiological idea by a very ugly biochemical fact!"

If foods do not explode in your stomach, they surely will in the intestines. "Sulphur, salt-peter and charcoal are all very innocent chemicals until they are combined. Then they make dynamite. Most foods are innocent and will build you up until they are wrongly combined in your intestines. Then they explode . . . . Unless you hit the food combination trail your troubles will go on and on . . . . Become a self-winder. Some are on the black trail and some have found the gray trail. Decide to take the bit in your teeth awhile and see if you can't feel better.

To find out how to treat your type, send $15 for a course." One who did so reports, "I have diabetes and he advised raisins, figs, dates and Spanish peanuts."

Acid is another word to conjure with. Dietary alkalinity is preached as eloquently as if there existed incontrovertible experimental evidence to show that a long-continued acid diet is injurious. Dr. Du Bois had Steffanson and Anderson on such a diet for a year, and reported that no harm resulted. In laboratory experiments on rats no pathological changes were found in urine or kidneys after they had lived one-third of a lifetime on a diet made acid by addition of calcium chloride, although growth was less than on control diet. There are many competitors for the honor of warning the world about acid. Priority is claimed very definitely by the author of *Sanatology, the only Science of Health*: "I am the first man in the history of the world to make the pronouncement and prove that acidosis and toxicosis are the two basic causes of all disease." He, too, promulgates the strange doctrine that acidosis is brought about by bad combination of foods, and that starches and proteins should never be eaten at the same meal, though what the connection is one cannot possibly imagine. A correspondence course is offered for $50, and the cult goes far and wide over the radio.

The editor of a "Health Culture" magazine, whose attention had been called to a report of some research work from the Nutrition Laboratory of Teachers College, was moved to protest thus: "I cannot recall any gain in human diet from laboratory investigations, practically considered, nor can I discover gain in any kind of research in the food line." Although this gentleman was dropped from membership in the American Medical Association 30 years ago, he is today reaching millions over the radio with this sciosophy: "Simple eating, simple as it is, and safe and right, is the last thing and best and least understood and rarely practiced." How shall it be practised while such false teachers are allowed to fill the ears of the poor and the sick? When other appeals fail, there is always the fear instinct for such fakers to trade upon. Common table salt is accused of producing cancer, tuberculosis, Bright's disease and bald heads. "Table salt has no place in an enlightened diet, never did have, never can have, serves no useful purpose and is highly destructive." Is one believed if he can only be sufficiently dogmatic in printed statements?

Some few years ago the Division of Medical Products of the American Chemical Society issued this warning to its members: "The old patent medicine methods are being applied in more subtle form to every chemical

discovery which has the slightest bearing on the treatment of disease." This applies with full force to the chemistry of the mineral elements. Professor Sherman, after his analysis of 224 American dietaries, wrote "Since American dietaries are probably more deficient in calcium than in any other element, the value of milk as a source of calcium is a large factor in its unique importance in the dietary." Here is the sciosophical interpretation: "Calcium deficiency is almost universal in this country—a factor in some 90 per cent of our ills with the exception of epidemics and injuries. Diabetes and cancer are due to a calcium-deficient diet . . . . Use mineralized candies—preferably in excess of an ounce a day—"Power Candy Mineralized"—the greatest energy producer we have for human use is candy." . . . . "You live on one-third of what you eat. The doctor lives on the other two-thirds."

About a year ago I had occasion to write to Dr. Arthur J. Cramp, Director of the Bureau of Investigation of the American Medical Association, concerning a certain method of "Harmonized Food Selection" which was being promoted in New York. The proponent advertizes himself as a "nationally known authority on food science," his cult being:

> "You must know your chemical type so that you may be aware of the foods that blend with your chemicanalysis. . . . . The calcium man is the pioneer. He is the inventor and originator, the man of concentration, of burdens. A builder, fighter and executive, he is the type of man who can accomplish much and say little. Two of the richest men in the world are typical of calcium men. Very few women belong to this type. . . . . The carbon woman is fair, pleasing and usually possesses clear blue eyes and a creamy white and pink skin. Genial and sociable, she is fond of pleasures, amusements and parties. Many famous beauties are carbon women while a former king of England was a distinct masculine carbon."

It is equally amazing to learn that the sulphur woman is a beautiful creature of moods, the phosphorus man or woman is delicate, refined, high-minded and cultured, with a pear-shaped face and wistful eyes, the hydrogen men rise to high position, while hydrogen women are quiet and cool, but have fiery tempers.

This sciosophist sometimes writes M.D. after his name, though never, as far as the American Medical Association has been able to find out, graduated by any reputable medical school. He has run a food factory which sold table salt at $1.00 the pound. In 1929, working his scheme in Florida, he was arrested, and rather than meet the charges of the authorities, transferred his activities to New York City, where he offered his wonderful "Method" for $25.

It would have been too much to expect that the vitamins should escape exploitation by quacks although one of them some years ago ventured this choice prediction: "Within the next five years the vitamin theory as now exhibited will be as dead as the calorie theory, which is no longer exhibited at all despite all the noise which it once made, and all the scientific men of the world will by that time have accepted the indispensable, ever-precious and ever-more-wonderful mineral salts, colloids and solubles of whole foods, particularly greens and sprouting foods that are in a state of biochemic activity, as the keystone of the arch of nutrition, natural immunity, resistance to disease, growth, strength, endurance, vitality and normal life." The "Sanitissa Laboratory" certainly did not believe him. It is now devoted to deficiency diseases and the writer of its bulletin has more information about vitamins than any well-known scientific investigator in this field. He says:

> "Early in my vitamin investigations which grew out of the discovery of vitamin F on July 5, 1927, while experimenting with a fruit diet for St. Vitus dance, I found that vitamins play an important rôle in the prevention of obesity and underweight. . . . . The little known vitamin E has been called an accessory foctor by serveral investigators. Another has discovered by Kendall in thyroxin and may be called vitamin I. . . . . They serve as draughts to the human furnace and are utilized without appreciable oxidation. New food factors of the accessory (amine) group are vitamins K, L, M, N, O and P. . . . . Overweight is usually due to a deficiency of essential vitamin B, C or D in conjunction with accessory vitamin I, M, or N; while underweight is usually due to a deficiency of A or F in conjunction with E, K, L, O or P. . . . . Vitamin E is fat-soluble and may be extracted with alcohol or ether.
>
> "It is abundant in peanut oil, wheat germ oil and lettuce. Deficiency is characterized by a muscle-bound condition about the mouth giving an 'Irish Mick' expression and by underweight. . . . . Vitamin O (new) is found in blood and probably figs. It prevents underweight and a muscle-bound condition in the region of the thighs resulting in lack of bladder and bowel control and frequently lumbago. Vitamin P (new) is found in blood. It prevents underweight and waxy bluish-purple hue to the skin which blanches when touched. . . . Vitamin M (new) is found in blood and grapes. A deficiency frequent after acute fevers, causes the hair to fall out and a muscle-bound condition of the scalp to develop."

Another food fad organization (which has made special appeal to the dental profession) is the Defensive Diet League of America. Here is the fundamental principle of its president, who believes that he is the Moses to lead the lost tribes of dentistry out of the desert of dietetic ignorance. "All so-called 'diseases' are but so many more or less lo-

calized manifestations or symptoms—vents, safety valves, perhaps, warnings at least—of one underlying condition, toxemia, the result of acidosis, brought about by habitual and long continued eating of the wrong foods at the wrong times or in wrong combinations."

Such leaders are followed by many who are unable to see the fallacies underlying their pronouncements, and are impressed by their self-assumed titles, and also, alas, are followed by those who though educated, still believe in magic—"there must be something in it"—because it appears in print and gets a public hearing on the radio. Some of the titles assumed are amusing; for example, how would you like the services of a "D.M.D.," a "D.O.," or a "Food Scientist, Diet Specialist and Humorist?" Perhaps you would like to consult "The American Educational Food Council" or "The Atonement Dietary Service" (for which prices range from $5.00 to $500). "Even the highest price is cheaper than a single operation or a funeral!"

Belief in the virtues of specific foods is as old as man himself. Did not the apple lead to the fall of man? A woman who has risen up to guide our eating says of "Fruits, their Virtues and Uses": "Of all the products in the vegetable kingdom, fruits are nature's highest achievement in the effort of creating distilled water. . . . Every person must learn through hunger and self-imposed fasts, through right thinking and simple living, how to determine the proper selection of fruits most congenial and effective to his particular nature." Consumptives, catarrhals and those suffering from hay fever will find the cherry a remedy (two different kinds together, sweet and hearty or black and red or black and white), but catarrhal and bronchial people are warned not to use any grapes. "Disease germs *of a mineral nature*" may be readily eliminated from the system through a judicious selection of fruits, but a northerner must use those from the extreme south and "the equatorean" should confine himself to northern products. "It is better to eat fruit three times a day in homeopathic quantities than once a day allopathically! . . . . If fruits disagree with you, it is because of your acidulous condition, in which case your stomach no longer separates your food, but leaves the operations to the acidulous side of the digestive apparatus, leaving the salts of minerals indigested, forcing crystallization upon the acids themselves, and consequently marring the functional operations of the stomach and its relative organs." Could there be a more perfect example of drawing upon a wholly uneducated imagination?

Dietitians have won many battles but there are plenty yet to fight. These samples of sciosophy in the food realm have not been offered merely

to amuse. The real purpose is to stimulate all to renewed care not to be misled by high-sounding phrases, but to look for their true meaning and consider the character of those who utter them. Let us give thoughtful heed to the words of our eminent physicist, Robert A. Millikan, when he says, "We need science in education and much more of it than we now have, not primarily to train technicians for the industries which demand them, though that may be important, but much more to give everybody a little glimpse of the scientific mode of approach to life's problems, to give everyone some familiarity with at least one field in which the distinction between correct and incorrect or right and wrong is not always blurred and uncertain, to let everyone see that it is not true that 'one opinion is as good as another'."

Make use of the information which can be obtained from the American Medical Association. Its reports, the result of seasoned judgment as to what may legitimately be said of these fakers, are most helpful. The true scientist may be known by his readiness to give the evidence upon which his claims are based, and to indicate the facts and explain his judgment with regard to their interpretation and application, *without pecuniary reward*. It is well to have an unbiased scientist interpret many so-called experiments. Good ones depend for their value upon the skill with which they are planned, the accuracy with which they are carried out and the fairness of the deductions made. At the celebration of Professor Cannon's twenty-fifth anniversary already referred to, one of the speakers said, "I can remember the time when I got a red-headed nurse to take care of a red-headed patient so as to test the truth or falsity of an old folk idea to the effect that two rufous persons do not get on well together. Soon my two experimental animals were the best of friends; I was sure that I had established the falsity of another old saw, and then I discovered that the hair of the patient was dyed!"

Very often conclusions are drawn without regard to all the factors in the situation. Here is a case in point—a testimonial advertisement: "For the past four years my little girl—aged 9—had been very much underweight although I had tried everything I heard of to build up her weight and health. About a month ago I started her on—(a well-known cereal food). I was skeptical—but she liked it very much and frequently ate it twice a day. On October 25—when I started her—she weighed exactly 56 pounds. On November 7th—two weeks later—she weighed $61\frac{1}{2}$ pounds, a gain of $5\frac{1}{2}$ pounds which brings her weight up to normal for the first time in four years. Of course, she has fruits, vegetables, meats and cod liver oil, but she always did have these foods and they

brought no marked results. May I thank you for what your wonderful cereal has done for my little girl?" There is magic in the name for that mother. She does not realize that so much dark bread or any other dark cereal (plus the additional milk probably taken with the cereal) could have made her child gain weight simply from the added calories. How much easier to believe in the magic of a food than to study its nutritive values in relation to the diet as a whole!

The perversion of scientific findings for one's own ends is well exemplified by the attempts made by those interested in the sale of sugar to force consumption to the limit of human capacity. "Fat burns in the fire of carbohydrate," therefore eat raisins to reduce your weight! Could anything be more absurd? Here is one more subtle: "The child can buy more enjoyment for his money in a candy store than anywhere else. But it is equally true that he buys more energy. . . . of which he needs an almost unlimited amount . . . . for manufactured candy is the quickest known source of energy. Provided his three meals a day supply him with the proteins, minerals and other food elements required for growth and health, the child's candy purchase is a wise one." What a volume in the word "provided!" How seldom the conditions for the "wise" purchase can be fulfilled! And how is the child's taste to be conserved for milk and plainly cooked vegetables? Again we read of "wholesomeness" and "safeguards": "Parents may feel assured of the purity of all ingredients which go into modern manufactured candy. The government maintains a careful supervision of all manufacturing processes and ingredients, with special regard for the purity of coloring and flavoring materials. The candy industry itself has set up and maintains high standards of purity and wholesomeness, so that children with pennies to spend are doubly safeguarded in the candy store." Should we not seek to bring to every parent's attention the bulletin which Professor Sherman prepared for the American Child Health Association, "The Problem of Sweets for Children," in which he says, "In general the proper place of sugar in the food supplies and eating habits of children is not in such concentrated forms as candy, nor in the indiscriminate and excessive sweetening of all kinds of foods, but rather as a preservative and flavor to facilitate the introduction into the child's dietary of larger amounts of the fruit and the milk, the importance of which to child health has been increasingly emphasized with each year's progress in our knowledge of nutrition." Such use does not encourage the patronage of the candy shop by children. The vision of children as prospective consumers is too apparent: "In spite of the depression school children

leave home every morning with thousands of dollars tucked into their collective pockets. In the juvenile budget, candy is an important item, as government figures show. In 1931, children spent approximately $40,000,000 for penny candy alone, besides buying a large share of the bars and other types of candy sold." In this connection ponder well Professor Sherman's further words: "It is a sobering thought that sugar, as it now comes into commerce, is the most completely devoid of proteins, vitamins, and mineral elements of all the foods which we give our children. From the nutritional standpoint, therefore, it would seem that sugar should be of all foods the most cautiously used in feeding children lest it displace too much of the foods which can do what it cannot in supplying the proteins, vitamins, and mineral elements which the children need so urgently and so abundantly for their healthy growth and development."

In any particular field, then, consult not the man with something to sell, but the best investigator in that field, or some one who is not only skilled in many phases of investigation, but in addition has been for years accustomed to weighing evidence and giving just interpretations, the result of combined knowledge and judgment. Remember, too, that a great discovery cannot be made by one who has not been technically trained and disciplined. Pasteur set up a rule for his own guidance—never believe anything if you can help it. Unless the evidence was overwhelmingly convincing, he would seek for more and withhold judgment till it came.

The other day a man came to see me with a little book in his hand. I recognized it as one which had been reviewed in the *Journal of the American Medical Association* not very long ago. The man was greatly worried about eating bread or meat because of the "acids" which he would accumulate. I tried to allay his fears and after he had gone I looked up the review, which reads as follows:

> "The author of this work lives in California and he displays a strong preference for such products as oranges, lemons, grapefruit and beans. The little book by its misstatements seems continually to twist truths to make them support the alkaline-ash, high residue fad. His knowledge of the science of nutrition seems to be weak, for he speaks of proteins as the chief sources of muscular energy. Thus the woman shopper gets a headache long before noon because she does not eat a large breakfast. She has consumed her own fat and so much of her own protein that its acid-ash has caused an acidosis. Benedict's fasting artist, Levanzin, managed to starve for thirty-one days without increasing his protein metabolism above the normal level, but Blank's shopper apparently could not last half a day. He makes another remarkable statement about a football game: 'Whereas 3,500 calories per

day is sufficient for a man doing average work, and 5,500 calories is the army ration, our college football players often use up 8,000 calories during the game. They enter such games without food or with a very light lunch. Their energy comes from the burning of their own lean meat, and the more muscular they are the more endurance they seem to have. It is a simple matter to calculate the result of such a football contest. Lean beef round furnishes 512 calories a pound and therefore Blank's athlete would lose in the course of the game $15\frac{6}{10}$ pounds of muscle. He would have to eliminate approximately twenty times as much urea as the ordinary man does in a whole day and this would require about 5 or 10 pounds of urine over and above the amount of water furnished by the break-down of this muscle tissue.' Now Benedict and Joslin calculate that a football player in a hard game loses about $13\frac{1}{10}$ pounds of water through skin and lungs. This would make Blank's man lose between 34 and 39 pounds of weight in the course of little over an hour. Blank does not explain just why a football player expends from thirteen to fourteen times as much energy per hour as bicycle riders on a century run, or swimmers or mountain climbers. A textbook of physiology would give him the figures and any good textbook written during the last two generations would tell him that physical exercise causes practically no increase in the protein metabolism."

But note what a home economics journal (not the *Journal of Home Economics*) said of this same book at the same time: "*Sensible* is above all others the word for this book, and there is no home economics student or teacher who could not use it, no school library where it would not have as good a place as in the hands of the layman. . . . A number of dietitians and teachers who have seen this book have considered it a very valuable volume for reference work and have suggested that we duplicate our physician's offer to workers in their field." To what untrained person was this review entrusted? And how many thoughtless teachers have accepted the endorsement?

It is to be hoped that all are familiar with the Committee on Foods of the American Medical Association which is an outgrowth of the Council on Pharmacy and Chemistry. Owing to the fact that our scientific knowledge of foods is more recent than such knowledge with regard to drugs, and that the character of advertising has changed so that food products hold a place almost equal to that of biological and pharmaceutical preparations, the Committee on Foods was appointed in 1930. To date (August, 1932) 1168 foods have been submitted, 670 accepted, and 13 definitely rejected; the rest are pending. According to the ruling of the Committee, foods must comply with the requirements of the U. S. Food and Drug Administration. Information must be furnished as to nature and proportions of raw material, method of manufacture, chemi-

cal composition, calorie value, hygienic conditions of preparation, bacterial cleanliness, vitamin content, and claims used in promotion. Quite as important is the stipulation that checks on the above are to be made at regular intervals. Copies of rules and regulations and of General Committee Decisions are available. None can be called "tonic" or "health" foods. Gelatin cannot be considered an aid to the digestibility of milk and milk products. An accepted canned tomato juice must have a vitamin content practically equivalent to that of the raw tomato juice used, or else must indicate the potency. An accepted canned, strained, or sieved vegetable for infants shall have a vitamin content practically equivalent to that of the raw vegetable, in so far as it is possible to obtain this by most modern and efficient manufacturing methods; and the mineral content must be similarly conserved. Irradiated foods must indicate equivalence of cod liver oil in vitamin D or carrots in vitamin A, of orange juice in vitamin C, and of yeast in vitamin B. The value of the published reports as sources of information about chemical composition of market products will be readily recognized.

The Division of Foods and Nutrition of the American Home Economics Association has recently appointed a committee on ethical practices, of which Dr. Margaret S. Chaney of Connecticut College for Women is Chairman. This Committee aims to furnish the Association, through its official journal, reliable published information about various products and is making brief digests of the reports of the American Medical Association Committee on Foods and Nutrition. The Committee will welcome information regarding food advertising statements that are known to be deceptive.

The National Better Business Bureau, with headquarters in New York City, issues bulletins in the interest of truthful advertising to editors of publications and may be a helpful source of information.

The American Dietetic Association has made excellent progress in raising the standards for the training and preparation of dietitians. It has a journal whose quality is ever improving; and by individual teaching and practices is doing much to establish truth and confound error. But be warned. There is need for unremitting vigilance in order to guard the profession and protect the unwary from false guides.

Kenneth Roberts, in an article in the *Saturday Evening Post* entitled "An Inquiry into Diets" (October 15, 1932), shows what happens to one who collects diet books regardless of who wrote them, and accepts the authors at their own valuation. He asked Senator Moses of New Hampshire to help him make his collection, and from the Congressional

Library he received "a dark gray mail sack which apparently held two grand pianos and a kitchen stove; when opened it proved to contain nothing but the cream of diet books." He says "They are written by doctors, most of them—the most recent school of diet thought believes nearly every disease in the world to be not only the result of eating improper foods, but also the result of eating proper foods in improper combinations. . . . . Unless he is eating the food that the diet books say he ought to eat, he is being as effectively poisoned inside as though he had been nurtured on poison ivy salads with bichloride of mercury dressing. . . . . If a person is so ignorant as to permit fermentable foods to pass his lips he is doomed. . . . . They give him acidosis and what acidosis will do to him, in a quiet way, almost passes belief. . . . . All this being so, I cannot help but think that the medical profession is in urgent need of a King James who can persuade the diet doctors to unite on an authorized diet for the good of the country. If this proves impossible of accomplishment, I am faced with the inescapable conclusion that all diets are worthless; that the diet doctors, in spite of their claims are not interested in the good of the country; and that the medical profession is incapable of recognizing a proper diet when they see one."

It is indeed sad that sciosophists, proven by their own words to be sons and daughters of "systematized ignorance," should ever be regarded as representative of the highly trained, scientifically-minded medical profession, which has publicly repudiated many of them. On the other hand, comforting is the hope that the 2500 members of the American Dietetic Association, ever advancing their standards of scientific training, may spread freely the fundamental principles of good nutrition upon which all experts in the science are agreed. Then dietetic quackery will bring no dividends and the charlatans will flee to realms where ignorance is denser and trade in magic more profitable.

VITAMIN STUDIES ON PEARS. I. A DETERMINATION OF THE AMOUNT OF VITAMINS A AND C IN THE WINTER NELIS AND THE D'ANJOU AFTER PROLONGED STORAGE[1]

IRA A. MANVILLE AND FRITZI G. CHUINARD

THE experiments herein reported are the first of a series in which it is hoped that information may be obtained in regard to the following points: (a) the vitamin content of pears; (b) variations in vitamin content according to variety, and (c) according to the region in which the pear is grown; (d) the degree of vitamin loss as a result of storage; and (e) the distribution of the vitamin in the various parts of pear. The present paper is concerned with the vitamin A and vitamin C values of the Winter Nelis and the d'Anjou after a maximal period of storage.

REVIEW OF LITERATURE

For the last several years data have been accumulating in regard to the vitamin content of various fruits and vegetables. Relatively little work, however, has been reported on pears. In Sherman's most recent edition (1) no citations of such experimental work are given. Nor is the subject dealt with in circular No. 84 of the United States Department of Agriculture (2), except for the report of Craven and Kramer (3) on the vitamin C content of fresh and canned pears. These workers reported that 10 to 15 gms. of raw Kieffer pear is a minimum protective dose. Kramer, Eddy and Kohlman (4) state that 30 gms. of canned, ripened Kieffer pear did not protect guinea pigs from the development of scurvy and that Bartlett pear, either raw or canned, is even lower in vitamin C. Wats and White (5) found that fresh, ripe Kulu pear, when fed in amounts ranging from 3 to 10 gms., was unable to protect guinea pigs from the development of scurvy. Sherman (6) gives the following values for pears in general: vitamin A, evidence lacking or insufficient, vitamin B ++, vitamin C + and vitamin G ++. As far as we know this is the extent of the work that has been reported.

[1] From the Department of Physiology, University of Oregon Medical School, Portland, Oregon. Received for publication, December 1, 1932. The expenses of this research were met by a special fund granted by the Oregon-Washington Pear Bureau. The authors wish to express their thanks to Mr. Paul A. Scherer and Mr. William H. Horsley for the assistance they have so readily given.

SOURCE AND HANDLING OF PEARS

Two varieties, raised in near-lying districts, were fed as sources of vitamin A and C. The d'Anjou pears were picked on September 3 to 5, and the Winter Nelis on October 9 to 11, 1931. The d'Anjou were therefore five weeks older than the Winter Nelis when they were placed in cold storage and held at a core temperature of 30 degrees F. The pears were picked probably three to four weeks before they would have been soft on the trees. The soil of the orchard furnishing the two varieties is practically the same, being fine, sandy Salem loam. No sulphur had been used on the pears.

Pear feeding, using two different lots, began on March 3, 1932, and continued until June 26, 1932. The first lot was fed from March 3 until April 22, and the second from April 22 until June 26. The d'Anjou is usually off the market by April 15, and the Winter Nelis by May 15, thus the feeding of the d'Anjou continued for some two months after its usual marketing period, and the Winter Nelis for one month.

Both lots of pears were identical in variety, origin and method of handling and were placed in a refrigeration room (March 3 and April 22) at an average temperature of 43 degrees F. Once a month the room was "defrosted" with a two to four days' interval before the regular temperature was restored. Pears were removed daily from refrigeration only in such quantity as would be fed daily, placed in a dish covered by a damp cloth, and kept in a room whose temperature ranged between 65 to 70 degrees F. Under these conditions it was found that approximately 10 days were required to ripen the pears which were arranged in rotation so that no more than one day's feeding requirements were ripened at one time.

PROCEDURE FOLLOWED IN TESTING FOR VITAMIN A

Young white rats averaging 21 days of age and 30 grams in weight were selected from the litters of mothers raised on a diet (table 1) known to be low in vitamin A. The composition of the experimental diet used for the young rats which was also deficient in vitamin A, is indicated in table 2. Approximately 40 days on this diet were required for the depletion of the vitamin A reserves. At the end of this period, the growth curves having flattened out, observations were begun on the effect of the pear additions.

Thirty-eight animals were separated into nine groups of four or five each, with one male in each group. Group I was a negative control;

group II received 2 gms. of d'Anjou; group III, 4 gms.; group IV, 8 gms.; and group V, 16 gms. Two gms. of Winter Nelis were given to group VI while group VII received 4 gms.; group VIII, 8 gms.; and group IX, 16 gms. Food for the negative controls was mixed with water to make a rather thin paste. Food for the various experimental groups was made up by mashing the pear quotas (whole pear, not divided into thirds) into food and adding sufficient water when necessary to bring the resulting

TABLE 1

Composition of stock diet low in vitamin A

Cracked whole wheat	35.0 gms.
Cracked yellow corn	35.0 gms.
Alfalfa meal	4.0 gms.
Linseed oil meal	16.0 gms.
Commercial casein*	5.0 gms.
Calcium carbonate	0.5 gms.
Sodium chloride	0.5 gms.
Yeast†	4.0 gms.
Whole milk	ad lib.

* Miller Products Co., Portland, Oregon.
† Vitamin Food Co., Inc., 122 Hudson St., New York City.

TABLE 2

Experimental diet deficient in vitamin A

Casein (vitamin-free, Harris)	18 gms.
Crisco	5 gms.
Bleached dextrin	65 gms.
Salt mixture*	4 gms.
Yeast†	8 gms.
Viosterol (by mouth per rat daily)††	1 drop

* Hawk, P. H. and Oser, B. L., Science, 74: 369, 1931.
† Vitamin Food Co., Inc., 122 Hudson St., New York City.
†† Mead Johnson & Co., Evansville, Ind.

paste to the same consistency as that of the negative control Food was given each group in amounts just barely sufficient to supply their needs for each day in order to insure a complete share of the pear quota daily.

RESULTS

Sherman (7) defines a unit of vitamin A "as that amount which when fed daily just suffices to support this limited rate of gain (3 grams per week) in a standard test animal during an experimental feeding period of from four to eight weeks." Reference to figure 1 shows that, in general,

the Winter Nelis contains more protective value, at the level fed, than the d'Anjou. Two, 4, or 8 gms. of d'Anjou per rat per day, or 2 gms. of Winter Nelis, provided very little if any protection. Four gms. of

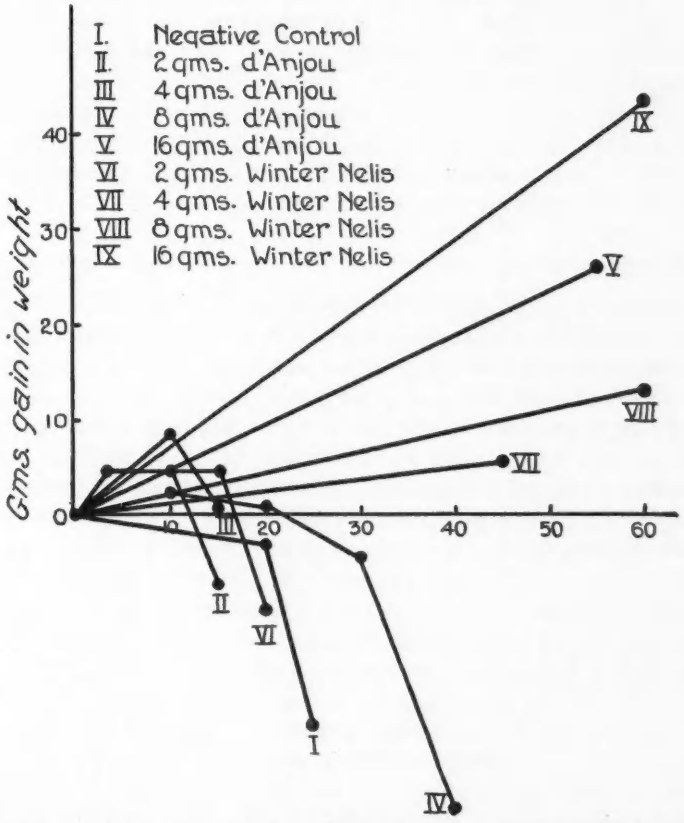

FIG. 1. GRAPHIC REPRESENTATION OF THE WEIGHTS GAINED BY THE VARIOUS GROUPS OF RATS RECEIVING DIFFERENT AMOUNTS OF TWO VARIETIES OF PEAR

It will be seen that Groups I, II, III, IV and VI lost weight and died. Only one group (V) receiving d'Anjou made a definite gain in weight. Three groups (VII, VIII and IX) receiving Winter Nelis gained in weight. Only one group, however, was alive at the end of the experiment (IX).

Winter Nelis was sufficient for only a very slight gain in weight over a period of seven weeks; 8 gms. of Winter Nelis, 16 gms. of d'Anjou or Winter Nelis, provided for definite gains in weight over periods of eight

and nine weeks. On the basis of the Sherman unit, we may conclude that the Winter Nelis contains 5 units of vitamin A per ounce, and the d'Anjou 2 units per ounce.

All of the females in group IX became pregnant and delivered litters during the latter thirty days of the experiment. One female delivered two litters. However, none of the young survived, the mothers apparently being unable to suckle them. We do not believe the weights of this group are as great as they would have been if they had not been subjected to the strain of reproduction, and it may be fair to assume that the vitamin A content of the Winter Nelis pear is a little greater than the quantity indicated by these experiments.

PATHOLOGICAL CONDITIONS ASSOCIATED WITH VITAMIN A DEFICIENCY

Although the vitamin A units were estimated on the basis of weight gain, it was thought advisable to keep a record of the pathological findings in order to determine what quantity of pear was necessary to maintain the tissues in a normal state, and to see if this quantity coincided with that necessary to provide a weight gain of 3 gms. per week over a period of four to eight weeks. This would provide evidence on which to base a statement in regard to the minimum amount of vitamin A necessary for complete protection against vitamin A deficiency.

The pathology found in deficient animals involves, for the most part, three tracts, namely: the respiratory, the alimentary and the urinary. Of the thirty-four animals showing a definite deficiency of vitamin A, only one showed no pathological developments in the respiratory tract; nine had no lesions in the gastro-intestinal tract; and two had no abnormalities in the urinary tract. Reference to chart 1 shows that the only group completely protected from signs of vitamin A deficiency was group IX, the group receiving daily 16 gms. of the Winter Nelis, and the only group whose members all lived through the experimental period. It would therefore appear that at least 2.5 units per day of vitamin A is required for complete protection against vitamin A deficiencies. We do not believe that the evidence is sufficient to state that the failure in lactation was due to a deficiency of the A vitamin, although this may be true.

PROCEDURE FOLLOWED IN TESTING FOR VITAMIN C

Forty-one adult guinea-pigs ranging in weight from 292 to 893 gms. (average weight 544 gms.) were placed on a basal diet complete in all

		RESPIRATORY TRACT			GASTRO-INTESTINAL TRACT		URINARY TRACT		EYES	REMARKS
		LUNGS	NASAL SINUSES	MIDDLE EAR	STOMACH ULCERS	TONGUE ABSCESSES	CYSTITIS	PYELONEPHROSIS		
Group I	Rat 1 ♂			++		+++	+++		±	
	2 ♀		+++	++	+	+++	+		+	
	4 ♀	+			+	+	+++		+++	
	0 ♀	+	+++	+++			+++	++	+++	
	3 ♀		+++	++	++	+++	+	+++	+++	
Group II	7 ♀	+	+++	+++		+++	+++		++	
	0 ♀	+++			+++	++	+++		+++	
	6 ♀	++		+++			+++		+++	
	5 ♂	+		+++	+++	+	++		+++	
	8 ♀	+			++		+++ Stones*		+++	
Group III	10 ♀	+		+++	+++	+	+	+++	+++	
	9 ♂	+++		++	+		+++		+++	
	12 ♀	+++		++	++		+++		+++	
	11 ♀			++		+++	+		+++	
Group IV	16 ♀	+++					+++		+++	
	13 ♂			+++	++	+++	+++ Stones*	++		
	15 ♀	+		++		+	+++ Stones*	++		
	14 ♀		+++	+++	+++	+	+++	++		
Group V	19 ♀		+++	+++						
	17 ♂		++	+	+	+	+++			
	20 ♀		+++	+++			+++			Partly eaten
	18 ♀	+	+			+++	+++ Stones*	+++		
Group VI	5 ♀		+++	+++	++	+++	+++ Stones*		+++	Brain abscess
	13 ♀	+			+++	++	+++		+	
	9 ♀				+++		+++	+++		
	0 ♂	+++	+++	+++	+++	+++			+++	
Group VII	21 ♂	+++	++	+++	+++	+++	+++ Stones*		+++	
	2 ♀		+++	+++			++	+++	+++	
	3 ♀	+++	+++	++			+++	++	+	
	4 ♀	++		+++		+++	+++ Stones*	++		
Group VIII	22 ♂	+++		++	+++	+	+++			
	25 ♀	+++			++		+++ Stones*			
	24 ♀	+++					+++	+++		
	23 ♀	+					+++ Stones*			
Group IX	26 ♂									♂
	27 ♀						*Some of			♀ 1 Preg.
	28 ♀						these stones			♀ 2 Preg.
	29 ♀						were 3 m.m. in diameter			♀ 1 Preg.

CHART 1. This tabulation shows the incidence of the lesions characteristic of A-avitaminosis. One, two or three plus signs indicate roughly the severity of the lesion. Note that the only group which failed to show any of the signs of vitamin A deficiency was Group IX.

respects except for a deficiency of vitamin C. The animals were grouped according to table 3.

The animals of the negative control died within 22 days, thus demonstrating the inadequacy of the diet in vitamin C. The positive control receiving the lemon juice lived normally throughout the experiment. At first the pear additions were small, but as the experiment progressed gradually increasing amounts were given to those animals showing defi-

TABLE 3

Various groups into which guinea-pigs were arranged and pear supplement which they received

GROUP	NUMBER OF GUINEA-PIGS	SUPPLEMENT
1	5	Inner third of Winter Nelis
2	6	Middle third of Winter Nelis
3	5	Outer third of Winter Nelis
4	1	Peel of Nelis
5	5	Inner third of d'Anjou
6	6	Middle third of d'Anjou
7	5	Outer third of d'Anjou
8	1	Peel of d'Anjou
9	5	Basal diet only (negative control)
10	2	Basal diet plus lemon juice (positive control)

TABLE 4

Experimental diet deficient in vitamin C

Rolled oats	60.89 gms.
Bran	31.39 gms.
Butter fat	4.95 gms.
NaCl	0.99 gms.
$NaH_2PO_4 \cdot H_2O$	0.49 gms.
$CaCO_3$	1.49 gms.

nite losses in weight so that the minimal amount of pear supplement necessary to maintain the animals in a normal condition could be determined. The quantities of pear fed are expressed in terms of grams of pear per 300 grams of body weight; this was calculated each time the quantity of pear was increased. The composition of the basal diet is found in table 4. Owing to the fact that the first four deaths were due to pneumonia, it was considered advisable to reinforce the basal diet as follows: the drinking cups, holding 100 cc., were filled with water after it had percolated through 10 gms. of dried yeast (Harris); the ether extract of 45 gms. of dried carrots was added to the butter fat, carefully

separated from melted butter in a separatory funnel; and the rolled oats were irradiated in thin layers by a Burdick lamp at one meter's distance for 10 minutes. The food mixture was moistened sufficiently to make it into a loose cake in order to reduce waste. Each day the portion of pear was fed by hand to each pig before it was given its food. Just enough food was placed daily in the food dishes to last the animal for that period, in order to increase its appetite for the pear.

RESULTS

Most of the guinea-pigs, receiving sufficient pear to carry them over a period of 40 days, showed quite a distinct drop in weight at some point between 15 and 40 days (average 25 days). At these times it was believed necessary to increase the amount of pear; usually the dosage was doubled. At first it was thought that this might be ascribed to the destructive effect of the defrosting procedure on vitamin C. We finally concluded that this was not the reason because of the variability in the time at which the "break" occurred and the lack of agreement between the time of occurrence of the "break" and of the defrosting process. Examination of the weight curves in figure 2 for April 12, May 7 and June 1, or any other periodic grouping, will show no uniform change in slope.

It might be thought that feeding one lot of pears for 45 days and then changing to another lot for the following 65 days would cause some discrepancies in the weight curves. That this is not the case can be seen from figure 2, which shows the weight curves of several animals that lived through both periods.

We are inclined to believe that approximately half of the vitamin C content of these pears is lost, under conditions with which we worked, in a period of about 25 days. It must be kept in mind, however, that this fairly rapid destruction of vitamin C occurred after the pears had been in storage for six months. Undoubtedly the pears would show a higher vitamin C content under more ideal conditions of storage during the feeding period and at a much shorter period following picking.

In regard to the d'Anjou, it was found that 3.9 gms. of inner third, per 300 gms. of body weight, was protective for the first period of 30 days thus indicating that this portion at the time had a vitamin C potency of between 7 and 8 units (9). During the second period, 5, 6, 7, and 17 gms. were ineffective in bringing about a restoration of weight, which suggested that from 75 to 80 per cent of the vitamin had disappeared. For the middle third it was found that 6.5 gms. for the first period and 14

gms. for the second period were almost protective; this indicates that during the first period the middle third not only has a potency of about 4 units, but that during the second period its value has decreased only

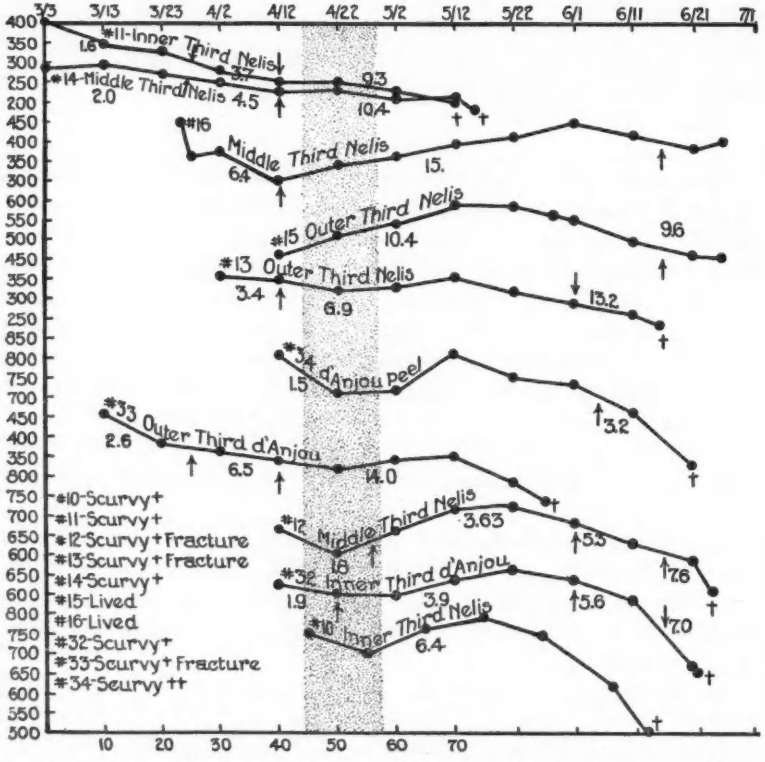

FIG. 2. THE WEIGHT CURVES OF 10 GUINEA PIGS RECEIVING VARIOUS AMOUNTS OF PEAR

At the top of the chart are given the dates on which the weights were obtained. It may be seen that, beginning with any date, a periodicity of 25–30 days will reveal no uniform change in weight that could be ascribed to sudden destruction of vitamin C by the "defrosting" of the refrigeration room. Furthermore, the stippled area shows a period of 10 days prior to and following the change from the first to the second lot of pears. Here again no consistent change in weight occurs. The arrows indicate the dates on which the amount of pear fed was increased. The figures between the arrows gives the amount of pear fed per 300 grams of weight of guinea pig.

about 50 per cent. The largest portion of outer third fed was 6.6 gms. and proved to be ineffective. The most that can be said in regard to the outer third is that it is inferior to the middle third. Surprisingly, the

peel of the d'Anjou was found to be the most potent source of vitamin C, possessing about 20 units per ounce based on the fact that 1.5 gms. was protective for the first period. The fact that 3.2 gms. was not protective for the second period indicates that half the vitamin had been destroyed by this time. Comparisons made between the inner and middle third show that the former is a little more potent than the latter, but that vitamin destruction occurred here at a much more rapid rate than in the middle third. The d'Anjou softened at the core more rapidly and extensively than the Winter Nelis. Whether or not this was due to the fact that it was five weeks older than the Winter Nelis we can not say, but it is not an unfair assumption to believe that such was the case. Unfortunately only two pigs received enough d'Anjou to carry them through a period of not less than 70 days. Guinea-pig No. 32 lived 71 days and received a maximal amount of 7 gms.; pig No. 33 lived 75 days and received 14 gms. This would indicate that the d'Anjou contains about 2 units of vitamin C per ounce.

Approximately 6 gms. of the inner third of the Nelis was found to be protective for the first period of 25 days, at the end of which the amount had to be increased to 10 gms. At the end of a following period of 25 days a further increase to 15 gms. was necessary; this indicates a decreasing vitamin C potency equivalent to 5, 3 and 1.5 units. The middle and the outer third were practically of the same potency—9 units for the first period of 25 days, 4 units for the second, and 2 units for the third period. An insufficient amount of the peel was fed to determine a protective dose. The largest amount of peel fed was 2 gms. per 300 gms. of body weight. The most that can be said is that the Winter Nelis peel possesses less than 15 units per ounce which indicates that it is inferior in this respect to the peel of the d'Anjou. Seven animals survived a 70-day period on the Winter Nelis; the largest amounts fed varied between 6.4 and 15 gms., or an average of 10.3 gms., with a vitamin C unitage of about 3.

PATHOLOGICAL CONDITIONS ASSOCIATED WITH A VITAMIN C DEFICIENCY

The pathological conditions which arose as a result of the vitamin C deficiency were so classical that space will not be consumed in describing them. Suffice it to say that hemorrhages varying in severity with the degree of the deficiency occurred in the subcutaneous and intramuscular tissues. One of the most striking occurrences was the extreme rarefaction of the bones especially noticeable in the femurs, humeri and mandibles as a result of which three of the pigs developed fractures.

No. 33, receiving 14 gms.of the middle third of the d'Anjou, had such an extensive hemorrhage in and about the fracture that it doubtless contributed, in a major sense, to the animal's death after being on the test 75 days. The same was true for No. 13 that was receiving 13.2 gms. of the outer third of the Nelis. No. 12, receiving 7.6 gms. of the middle third of the Nelis, lived 73 days and had an old, un-united fracture which did not, we believe, contribute to the death of the animal. It was interesting to note, however, the formation of callus since very little if any evidence of further healing was noted. Furthermore the osseous fabrication of the mandible and maxilla had become so extremely rarefied that it was impossible for the teeth to be held in a firm bed. The cancellous areas were saturated with old blood. The mouths of these animals possessed a foul odor reminding one of human cases of pyorrhea alveolaris. In this connection we may cite Westin (10) who believes that "it is not absolutely impossible that latent scurvy can present one of the endogenous factors in the etiology of marginal paradentosis." Other hemorrhages, not so severe, were found in the bladder, stomach, intestines, lungs and liver. The adrenals were remarkably enlarged.

It is not possible to state, as with vitamin A, what daily amount of pear is necessary to afford complete protection. The animals remaining alive at the end of the experiment undoubtedly had slight evidences of a scorbutic condition in their bodies. That this is to be expected is indicated by the method used for determining the number of vitamin C units, namely, that amount which enables an animal to live for more than 70 days. It also makes possible the statement that 1 unit of vitamin C daily does not enable a guinea-pig to maintain as normal a condition as that possessed by a rat receiving 2.5 units of vitamin A per day.

SUMMARY

The d'Anjou pear is in season from the middle of September to about the first of March, perhaps a little later, the Winter Nelis pear from October to about May 1. The feeding tests herein described were carried on from the first of March to the middle of June and therefore represent the most extreme conditions of storage. In spite of this the vitamin A content was found to be as follows: Nelis, 5 units per ounce and d'Anjou, 2 units per ounce. These figures compare favorably with the vitamin A content of beets, peaches and turnips. In regard to vitamin C it may be said that the various portions (inner, middle and outer thirds) contain different amounts of the vitamin, and that the peel seems

to possess the greatest amount of all. The d'Anjou peel, for example, contains about 20 units per ounce during the first period. Furthermore, the potency of the various thirds of the two varieties of pear do not follow the same order. The d'Anjou during the first period, for example, has a vitamin C potency of between 7 and 8 units for the inner third, 4 units for the middle third and even less for the outer third. The Nelis during the first period had a potency of 5 units for the inner third and 9 units for the middle and outer thirds. The vitamin C potency of the d'Anjou seemed to deteriorate faster than that of the Nelis so that, in general, each period of 25 days made necessary a doubling of the amount of pear fed. If the pear could have retained the potency it seemed to possess during the first period, the conclusion would be justified that the d'Anjou possessed between 4 and 8 units and the Nelis between 5 and 9 units. If the amount of pear fed during the third period (allowing the animals to live 75 days) be taken as the criterion for judging the vitamin C potency, only an amount equivalent to approximately 2 units for the d'Anjou and 3 units for the Winter Nelis can be claimed. We are inclined to believe that, in spite of the extreme conditions to which the pears were subjected, the vitamin C potency is better than 2 units per ounce. Accepting this latter figure, however, places the pear in a class with apples, beets, carrots, celery, grapes, lettuce, milk, onions and white and sweet potatoes as far as vitamin C content is concerned.

CONCLUSIONS

The vitamin A content of the d'Anjou pear, after prolonged storage, is 2 Sherman units; for the Winter Nelis, 5 Sherman units. Under the same conditions the vitamin C content is 2 units for the d'Anjou and 3 for the Winter Nelis. The vitamin C content of the peel appears higher than any fraction (middle, inner or outer third) of the pulp. The vitamin C potency of the various thirds of the Nelis appears to increase as the surface of the pear is approached. This is not so apparent for the d'Anjou. Available comparative data seems to indicate that the d'Anjou and the Nelis, after prolonged storage, contain as much if not more vitamin C than fresh Kieffer, Bartlett and Kulu pears.

The white rat needs at least 2.5 units of vitamin A per day in order to prevent the development of those gross conditions usually attributed to a lack of this vitamin. The nature of the vitamin C unitage does not permit of such a quantitative statement. One unit of vitamin C per day does not completely protect the guinea-pig from scurvy.

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SOME PROBLEMS OF FEEDING FEDERAL PRISONERS[1]

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MASS feeding, where groups of individuals with varied appetites are served with one menu, presents different problems from those encountered in homes or in public eating places in that there is no opportunity to cater to individual preferences. In mass feeding food may become not only a matter of satisfaction, but also a central theme of interest and speculation concerned more with the aesthetic appeal than with the nutritive value, and related to kinds of food, modes of preparation or of service. As the cost of food is decreased the problem of palatability increases.

In public institutions the individuals are under some degree of restraint; habits of life, even under the most liberal supervision, are dictated by the officials in charge and interest in food is even greater than in non-public institutions. Food becomes, therefore, an essential factor in morale, development, or rehabilitation. The inmates in penal institutions are placed there against their will and society must assume the responsibility for providing them with an adequate diet since they are denied the privilege of supplementing their own diet. On the other hand, extravagance in operation is not to be tolerated, either through the purchase of expensive foods or in the waste of food. Palatable as well as adequate food at a reasonable price is possible, provided proper attention is given to good cooking, attractive service, and to the addition of palatable foods produced with inmate labor on the institutional farm.

Large groups of individuals with little choice in their dietary, as in the army and the navy, college dining halls, or coöperative clubs, present problems of feeding fundamentally similar, yet differing in that such groups have a greater opportunity of expressing their approval or disapproval of the food or service. In some respects they are more difficult to satisfy than those in correctional or public institutions.

Successful feeding in any type of institution depends upon the initiative, imagination, skill, and ability of those who plan and prepare the meals and the manner in which the food is served. Economy of operation should not begin with the salaries of the dietitian, steward, chef, or cook. It should begin, rather, in the selection of competent individuals

[1] Read before the American Dietetic Association, November 9, 1932.

for these positions with salaries that will keep them reasonably satisfied; they should also be assured of sympathetic support in their activities.

The satisfactory and efficient feeding of large groups depends then upon these considerations:

(a) Food must be wholesome and nutritionally adequate for the amount and kind of work performed by the individuals.

(b) Efficiency must be judged by the cost of the adequate diet provided, not by the per capita cost alone, *i.e.*, men are fed on food, not money. In periods when food prices are relatively stable the cost of food per man per day may be used as an index of efficiency and effectiveness only after it has been established that an adequate diet can be supplied at a given cost; even then comparisons between institutions are not valid unless it can be shown that food costs are similar. Factors that may render costs incomparable are the distance from centers of food production and the use of products from institutional farms without charging their cost, or charging at other than prevailing prices.

(c) Palatability, especially for economical feeding, should be attained through labor in the preparation of food rather than through an excessive use of foods which are in themselves appetizing. It is better, *e.g.*, to extend the flavor of meat in combination with spaghetti, beans or vegetables than to feed steaks or roasts, and to increase the palatability of bakery products by the use of eggs and sugar. Meat and eggs should, of course, be served occasionally as such. Where the labor is supplied by those who eat the food they may develop as much palatability as possible from the food furnished by their own labor. There should be no objection to the use of flour, fat and fruit to make pie rather than to serve bread and sauce.

(d) Uniformity in the quality and amounts of food served in institutions over long periods is essential. Variations are likely to occur not only when food prices decrease, but also when they increase. During periods of decreasing food costs there is a tendency to feed more or better grades or varieties of food. These changes are usually accompanied by a saving in total food costs to be expected but not what they might have been. With increasing food prices the tendency is to serve either less food, less expensive or less palatable food. In the case of the decreasing food costs the satisfaction of the inmates will, of course, be increased, while conversely a general dissatisfaction will result. If a period of economy follows immediately after the period of plenty, the benefits of the latter are forgotten in the apparent hardship of the immediate situation. It is better therefore to supply a consistently uniform amount and quality of food and to depend upon foods in season and methods of preparation for variety, rather than to permit opportunity for the suspicion that insufficient or inferior food is being served.

These suggestions apply particularly to public institutions, but have a bearing as well in institutions where the food is paid for by the inmates. Once a standard of quality and cooking is established at a satisfactory

level, it is better to lower the charge for meals or to raise it, than to shift to higher or lower satisfaction levels at the same price.

In large institutions the method of control should be as simple as possible and preferably one that can be applied continuously. It should also yield definite figures for immediate and future reference and any basis of judgment must consider the amounts of food used as well as the cost and palatability. The simplest procedure for controlling operations of the institution kitchen is to set up approximate food costs, either arbitrarily or based on some measure of food prices, and to depend upon supervision of the menus and complaints with regard to food as a measure of an adequate and palatable diet; when supplemented by inspection of the food preparation, service and waste, a fair estimate of the situation may be obtained. The chief objection to this method is that the diet may be nutritionally inadequate unless the supply of food is unlimited. The menus of an economical diet may be adequate and palatable on paper, yet monotonous, unless variety in mode of preparation is stressed.

A more exact and practical control is based on the pounds or ounces of food supplied per man per day and is the first procedure in any analysis of a diet. Foods are grouped according to nutritional importance, relative cost and palatability. The groups adopted for use in the Federal prisons are contained in table 1.

In this grouping, meat, sugars and butter are separated not only for their distinct nutritive value, but also because they are useful in increasing the palatability of the diet. The cereal grain products and potatoes and roots form a very considerable part of the average diet; spaghetti, macaroni, rice, and beans, used in place of potatoes or as the main dish, are set apart because they may become monotonous if served too often. The leafy or green or yellow vegetables are grouped as important sources of vitamins and minerals while tomatoes are considered not only as a source of vitamin C but also as a palatability factor. Citrus fruits in the ordinary diet may be separated as a source of vitamin C. Eggs are viewed not only for their nutritive value but also as aids to the flavor and texture of prepared dishes. Milk and its products are important sources of calcium, protein, and vitamins.

Data expressed in terms of weights of various kinds of foods per man per day indicate not only the probable value of the diet in terms of such gross factors as energy and protein, but also the probable adequacy in relation to vitamins, calcium, and iron. Furthermore information is obtained on what is equally important in studying the habits of people; namely, the variety of food present in the diet as an indication of palata-

bility. Such information is expressed in units common to everyday life and may be obtained with a minimum of effort from the records of any well-conducted institution. With a slight rearrangement of the bookkeeping to conform to the grouping of foods, data on the food supplied in an institution may be reported automatically with a minimum of effort by the usual clerical assistance.

Weights of type foods are useful only when they have been evaluated by experience and the determination of the nutritive value of the quantities chosen. This procedure has been used in a number of cases (1, 2, 3, 4, 5, 6) and has had a wide application in relief work. Dr. Hazel K. Stiebeling of the Bureau of Home Economics has prepared dietaries, which will be available in the near future, in terms of weights of food groups for various ages, calorie requirements, and relative cost.

TABLE 1

*A basis for estimating the money allowance for food for federal prisons per man per day**

FOOD GROUPS	FOOD TYPE FOR PRICE BASIS	AMOUNT
		lb.
Meats and fish	Beef	0.75
Fats	Oleo	0.15
Flours, starches, cereals	Flour, white	0.80
Dairy products	Milk	1.00
Eggs	Eggs (at 1½ lb. per doz.)	0.03
Sugars and syrups	Sugar, granulated	0.25
Beverages	Coffee	0.10
Leafy, green and yellow vegetables (tomatoes 0.10 lb.)	Cabbage	0.60
Roots and tubers	Potatoes	1.00
Beans and peas, dried	Beans, navy	0.10
Fruits, fresh or canned	Apples	0.15
Fruits, dried	Prunes	0.08
Spices	Salt	0.10
Miscellaneous food adjuncts	Yeast	0.015

* These quantities of food refer to food as purchased. They could well be approximated on the average during a month. It is not expected that they will be met in detail each day.

An outline of the application of the type food method in Federal prisons will illustrate its use. A basis of comparison for these prisons was established by determining over a period of a year the kinds and amounts of food used in several large prisons. These results also supplied information with regard to seasonal variation. The data were grouped according to foods or types of food as indicated above and reduced to a comparative basis of pound of food per man per day; values obtained

were held to represent the quantity and palatability reasonably satisfying to a prisoner. These quantities were modified with regard to nutrition and economy, keeping in mind palatability. The resulting schedule (table 3) constituted the ration or basis of control. The various prisons are expected to keep within the schedule, with a certain amount of play between types of food that are nutritionally similar. Deviations from the ration are commented upon with constructive suggestions as to other changes that may be necessary if they are to be continued, or with instructions toward correction if the deviation is not desirable. Table 2 contains data on food supplied various Federal institutions, selected to show some extremes and the improvement that has occurred.

Control over price is attained through financial reports and the purchase of food by contract. It is also possible to estimate the probable cost of food at any institution by applying the prices paid for type foods of each group, or the prices paid for the food of any type that is used in greatest amount during a month, to the quantities of each food in the ration. It has been found that such a calculation in a well-conducted institution will approximate the actual expenditure for food within plus or minus 10 per cent, when the prescribed type foods are used. If the prices of food used in greatest amount in any month are used the approximation would be even closer. Through the use of data on the composition of type foods, data within a food group, or on average composition with foods weighted according to relative apparent use as proposed by Dr. Stiebeling, it is possible to make a good approximation of the nutritive value of the food eaten, should such a calculation be desirable.

The palatability of the diet is approximated through an analysis of the amounts of food used per man per day and of the menus. The menus are reported on three sheets for each month, one sheet containing all the breakfasts, another the dinners, and a third the suppers. These sheets are divided into columns headed by the various dishes and sauces or dressings usually appearing at a meal; in other words, they are menu patterns. The menu for a meal appears on one line under particular headings. Such a report facilitates a study of variety in food, as well as of monotony in planning and is much more efficient than looking over thirty daily menus carrying all three meals on a sheet.

Reports on food consumed appear on the Mess House Operations Account submitted monthly and contain the total current monthly cost to date for each item of the ration, the cost per man per day, the total amount of food used, and the amount used in pounds per man per day. They also contain certain costs for operation of the kitchen aside from

TABLE 2

*Average consumption, pounds per man per day**

	MEATS AND FISH	LARD	BUTTER	FLOUR, ETC.	SPAGHETTI, ETC.	DAIRY PRODUCTS	EGGS	SUGAR AND SYRUP	BEVERAGES	POTATOES	ROOTS	LEAFY, ETC. VEGETABLES	TOMATOES	DRIED BEANS	FRESH AND CANNED FRUITS	DRIED FRUITS	MISCELLANEOUS FOOD ADJUNCTS	SPICES	TOTAL
1930																			
Atlanta	0.615	0.120		0.894		0.261	0.063	0.335	0.049	0.936		0.501		0.250	0.135	0.078	0.011	0.086	4.334
Chillicothe	0.964	0.088		1.185		0.354	0.035	0.512	0.103	1.340		0.315		0.298	0.104	0.085	0.016	0.127	5.523
Fort Leavenworth	0.802	0.196		0.742		1.014	0.103	0.439	0.126	0.942		0.327		0.159	0.115	0.034	0.024	0.110	5.133
Leavenworth	0.946	0.157		0.957		0.770	0.075	0.431	0.120	1.036		0.386		0.239	0.183	0.067	0.021	0.102	5.490
McNeil Island	0.843	0.126		0.664		0.936	0.031	0.378	0.094	1.222		0.361		0.063	0.167	0.144	0.016	0.100	5.145
Average	0.834	0.137		0.889		0.667	0.062	0.419	0.099	1.095		0.378		0.202	0.140	0.082	0.018	0.105	5.125
1931																			
Atlanta	0.657	0.038	0.075	0.812	0.034	0.490	0.057	0.348	0.064	0.623	0.301	0.483	0.161	0.164	0.185	0.086	0.012	0.101	4.691
Chillicothe	0.912	0.081	0.017	0.980	0.064	0.601	0.109	0.367	0.124	0.177	0.245	0.322	0.125	0.151	0.092	0.084	0.025	0.095	5.571
Fort Leavenworth	0.782	0.119	0.080	0.603	0.028	0.847	0.111	0.408	0.126	0.703	0.140	0.216	0.082	0.060	0.237	0.031	0.021	0.094	4.688
Leavenworth	0.874	0.092	0.100	0.913	0.024	0.759	0.049	0.448	0.118	0.659	0.161	0.347	0.131	0.037	0.101	0.047	0.021	0.086	4.967
McNeil Island	0.946	0.097	0.072	0.796	0.075	0.706	0.028	0.534	0.126	0.821	0.784	0.313	0.134	0.064	0.123	0.112	0.029	0.128	5.888
Average	0.834	0.085	0.069	0.821	0.045	0.681	0.071	0.421	0.112	0.797	0.326	0.336	0.126	0.095	0.147	0.072	0.022	0.101	5.161
Fiscal year 1932																			
Average all main lines	0.735	0.084	0.063	0.826	0.037	0.759	0.095	0.387	0.090	0.845	0.252	0.436	0.115	0.089	0.318	0.053	0.024	0.085	5.294

* For the year 1930 data under columns headed "Flour" and "Spaghetti," "Potatoes" and "Roots," "Leafy, etc., vegetables" and "Tomatoes," are grouped together and centered under the two headings. For 1931 and 1932, the data are separate for each of the groups.

food, a statement of the prices of the principal type foods, or of those foods used in greatest amount during the month, and of the table waste and a calculation of the cost based on type foods.

In some institutions such detail may not be necessary, but in any large institution the expenditures for food, the possibilities for a satisfactory dietary and the savings possible under such a plan justify the work necessary to prepare it. When less frequent analyses of the dietary situation are desired, the book-keeping and stock records of the institution relating to food should be kept according to the particular classification of foods desired, as well as the population for given periods. Such records can easily be analyzed and if set up before control in institutions is begun they will yield valuable information on which to base changes in the dietaries.

Prison hospitals present a different problem from that of the regular mess. The hospital has its liquid, soft, diabetic, tubercular and other diets, men who are sick and eat but little, as well as men with good appetites able to eat anything. The average of such a population should not require so much food as the main prison mess. The hospital may use a different distribution of foods and have a different cost, unless the smaller amount of food used is balanced by a greater use of more expensive foods. In the hospital there is the added problem of discipline and distribution of a different variety of food from that supplied the main mess, through inmate attendants.

There is little information on the food consumption in hospitals, taken as a unit in terms of weights of food. In the accompanying table are data from two hospitals, one the Franklin Square in Baltimore with a varied population containing about sixty per cent of men with normal appetites, a well-trained dietitian and good supervision. The data represent an average of food used during September, January and May and are very similar for each of the months. The other example is the Iowa State Hospital (7). These data form a tentative basis for estimation of the operation of hospitals.

The data on prison hospitals in table 3 are given only for the purpose of illustration. Changes occurred during the years represented and are still occurring. We have given comparatively little attention to the dietary problems of prison hospitals, but better methods of preparation and service have been encouraged and attention has been called to obvious defects in operation or in the diet. The Public Health Service took charge of the medical service of the prison hospitals a little over two years ago and it is hoped that constructive work can be done with regard to the general prison hospital diet.

TABLE 3

Data on hospitals and other data on food requirements in pounds per man per day

	ADEQUATE DIETS, MODERATE COST STIEBELING*		R.O.T.C.	AVERAGE ALL PRISON HOSPITALS FOR 1931–32	PRIVATE HOSPITAL NO. 1	PRIVATE HOSPITAL NO. 2
	Moderately active woman	Moderately active man				
Meat	0.247	0.343	0.73	0.642	0.350	0.512
Fats	0.033	0.069	0.09	0.069	0.050	0.030
Butter, etc.	0.055 } 0.088	0.082 } 0.151	0.12 } 0.211	0.093 } 0.162	0.051 } 0.101	0.105 } 0.135
Grain products	} 0.329	0.603	0.64	1.007	0.357	0.457
Macaroni, etc.				0.039 } 1.046	0.018 } 0.375	0.012 } 0.469
Dairy products	2.200	1.097	0.098	2.565	0.789	2.023
Eggs	0.062	0.062	0.27	0.203	0.115	0.194
Sugar	0.123	0.206	0.22	0.326	0.173	0.215
Beverages			0.06	0.098	0.031	
Potatoes	0.343	0.438	} 1.13	0.743	0.490	0.998
Roots				0.169 } 0.912	0.064 } 0.554	0.171 } 1.169
Leafy, or green or yellow vegetables	0.301	0.274	0.65	0.406	0.307	0.367
Tomatoes	0.247	0.274	0.28 } 0.92	0.119 } 0.525	0.101 } 0.408	0.082 } 0.449
Beans, dried, etc.	0.041	0.082	0.08	0.060	0.009	0.017
Fruits, fresh & canned	0.480†	0.740†	0.55	0.372	0.353	0.614‡
Fruits, dried	0.069	0.096	0.18	0.046	0.037	0.064
Miscellaneous			0.006	0.016	0.015	
Spices			0.05	0.076	0.019	

* Preliminary data, Bureau of Home Economics, U. S. Departent of Agriculture.

† Includes roots.

‡ Citrus fruits, 0.377 lb.

Other data in table 3 are introduced as a basis of comparison and refer to some unpublished information obtained by the Bureau of Home Economics of the U. S. Department of Agriculture. These data relate to a suggested distribution of weights of foods for a diet of moderate cost for the average adult. The data under R. O. T. C. have been previously published (2) and refer to the food consumption of a group of medical R. O. T. C. students who, through attention to planning, cooking, and service, were caused to eat more of the leafy or green or yellow vegetables than is ordinarily taken by a group of men.

In using such data one must remember that any other group of individuals might have an adequate diet with a somewhat different distribution among the various food groups; we have such cases in certain groups of prisoners in the south. On the other hand, most of the information collected shows that the distribution we have used is rather common.

SUMMARY

The major problems of effective mass feeding as applied especially to low-cost prison messes, are chiefly those of palatability. The quantities of food supplied should be wholesome and nutritionally adequate for the kind of work performed. The efficiency of a mess is to be judged by the cost of an adequate diet, not by the per capita cost alone. Palatability should be attained by work on food rather than through an excessive use of foods appetizing in themselves. Uniformity in the quality and amounts of food served in an institution is essential. A good measure of the effectiveness of a mess may be attained through the use of weights of types of food, pounds per man per day, and the menus.

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A CONTINUATION OF THE NUTRITION PROJECT IN NORTHERN NEWFOUNDLAND

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THE nutrition project among the natives of Northern Newfoundland, started by Mitchell in the summer of 1929, was continued as a more intensive educational development when a nutritionist was stationed in one community for a year. She left early in June, 1930. The journey North served in many ways as an introduction to the customs and living conditions of the quaint people among whom the investigation was to be carried on. Flowers Cove, a small fishing village on the extreme Northern Coast of Newfoundland, was chosen as headquarters for the work which was carried on in connection with the Grenfell Mission activities. The locale covered 70 miles of rough coast line and comprised a population of about 1500 people.

Upon arrival it was found that, in addition to carrying on health work, the nutritionist was also to supervise the Grenfell industrial work in the district. This work included rug hooking, weaving, knitting and toy making and as an additional duty she was to act as storekeeper two days each week in the Mission Clothing Store when the people were able to exchange their hand work for warm clothing. Only such time as remained after these duties were performed could be used for health education and nutrition work. The greatest difficulty was always the problem of transportation along the rugged coast. If weather and fishing permitted, a small motor boat was used; however, when "dirty weather blew up," the only available means of getting about was by walking over rocks and through swamps, but after the "big freeze" set in this difficulty was overcome to some extent as a dog team was usually available.

The people in this district had been experiencing great economic depression, not only due to the extremely low price of fish, but also due to poor fishing for several years past. Usually the food supply is procured in the fall for the entire year, but fish and money being unusually scarce, the purchase of food either by barter or with money was impossible, and many had to depend upon the government dole of food that consisted

largely of white flour, thus the majority of the population lived almost entirely on white bread, tea and molasses. For this reason not many complete dietaries could be obtained, but in general a difference was noted from those reported by Mitchell in this JOURNAL (March, 1930) in that some milk was used by almost all families during a part of the year. Besides this, during the previous summer, the people had made a great effort to pick and store as many berries as possible for the winter. Raspberries, partridge berries, bake apples and some blueberries grow in quantities in the marshes of Northern Newfoundland, thus providing one source of vitamin-bearing food in an otherwise deficient diet. These fruits can be preserved very readily in wooden tubs without either sugar or cooking.

The average family of about nine individuals including four or five adults, uses approximately the following amounts of food per year:

9 bbl. flour (1 white)
4 bbl. wheat
45 gal. molasses
30 lb. tea
100 lb. sugar
½ bbl. salt pork or salt beef
3–4 bbl. native berries
10 bu. potatoes
100 lb. fresh fish
6 quintals dried fish (112 lb. to quintal)

A cow is usually shared between two families, thus furnishing a small amount of butter and milk, but the quantity of milk produced is low because of inadequate feed and poor pasture. Vegetables such as turnips, carrots, cabbage and beets are raised by some, while nearly every family has a few pounds of dried beans and peas. The fresh vegetables seldom last longer than December, and in many cases only enough are raised for a few meals.

The health and nutrition problems which presented themselves as paramount were: general malnutrition; low resistance to infection; tuberculosis; rickets; beriberi; poor teeth and chronic constipation. These conditions were common in every community along the coast and because of their prevalence and the impossibility of focusing attention on any one condition, they were attacked as a whole. A few relatively accurate figures on population, food supply and the incidence of three diseases are given in table 1. An attempt to correlate food supply and nutrition diseases proved futile, possibly due to the wide extremes encountered among the families of certain villages. The table is of inter-

est, however, as it indicates that quality rather than the quantity of the food supply may be at fault.

A nutritionist at work among such conditions faces a discouraging, yet a challenging proposition, and the creation of a desire for a change in living conditions must be her first objective. More agriculture seemed to be a feasible means of bettering conditions, and a large supply of garden seeds of quick maturing varieties were issued when ground was ready for planting. Garden tools were also in great demand, people coming from miles around for both seeds and the loan of the tools. Both garden clubs and a garden contest were planned as a means of

TABLE 1

VILLAGE	POPULATION			FOOD SUPPLY			DISEASE INCIDENCE		
	Number of families	Number of individuals	Number of adults	Number cows per 10 persons	Barrels per 10 persons		Per cent of total population		
					Potatoes	Other vegetables	Beriberi	Rickets	Tuberculosis
Flowers Cove	29	144	46	1.0	6.9	1.4	4.1	5.5	5
Eddys Cove	10	72	27	1.5	10.0	2.8	7	12.5	5.5
Green Island Brook	16	89	29	1.5	11.0	3.0	10	11	0
Green Island Cove	10	56	29	1.8	19.0	1.8	21	7.1	3.5
Pines Cove	6	31	17	1.0	9.0	1.6	19	12.9	6.4
Shoal Cove	12	46	23	0.4	8.6	0.6	6	6	6
Sandy Cove	15	90	35	1.7	15.5	1.3	10	4.4	3.3
Savage Cove	11	89	28	1.0	1.1	0	3.3	2.2	4.4
Nameless Cove	13	70	22	0.4	7.8	1.2	5.7	5.7	4.3
Upper Harbor	7	52	12	0.4	1.9	0.8	5.8	7.7	5.8
Lawless Point	5	46	12	2.2	6.5	1.1	11.0	6	2
Bear Cove and Seal Point	18	113	38	0.8	19.1	2.2	9	3.5	1.7
Deadmans Cove	5	27	14	4.0	37.0	7.4	14.9	7.4	0
Anchor Point	19	120	43	1.2	16.6	2.5	4.2	5	2.5

stimulating interest and the garden products were exhibited later in the fall for prizes.

The first real nutrition project attempted was a Health Week. This event was advertised through posters that announced the program, prizes and events in each neighboring cove or village. Baby shows, cooking demonstrations, health talks, good teeth campaigns and other competitions were used in an attempt to create interest in health and better food habits. Devices that might seem trite to some were novel in these communities. The nursing station was turned into an exhibition place where suitable clothing for children of various ages, and easily obtained foods that would prevent beriberi, tuberculosis, and rickets were ex-

hibited. The importance of cod liver oil was demonstrated in various ways and simple posters, in the language of the people, depicted the advantages of gardens, cows, improved ways of handling milk, or better sanitation. The people were so interested that some walked as far as 30 miles in the rain to attend. Each day during the week a certain phase of health teaching, or a specific health principle was emphasized. Since cod fishing was the main industry, each family was urged to make their own cod liver oil.

Cooking demonstrations, made possible by the contributions of several food companies in the United States, stressed the value of whole grain products and the use of bran and milk. Evaporated milk, for instance, was recommended as most economical. Through the courtesy of the Evaporated Milk Association, a liberal supply of this product was available for demonstration and distribution. After the women had been taught how to use the products, they were given samples of bran, whole wheat flour, and milk. Due to a wreck of a grain vessel the year before on this coast, nearly every family had some whole wheat on hand. Instruction was given in preparing this wheat for a breakfast food or, in combination with white flour, how to use it in making bread. Health week was spoken of by the people as a "great time" and frequent favorable comments about it were heard from an otherwise reticent people.

The Fair or Agricultural Show followed; on a given day the people from all the coves assembled at the church in Flowers Cove, bringing with them jam, breads of all varieties, handiwork, and any garden produce they had raised. Prizes were given for the best products. It was rather gratifying to note how many women had made their samples of bran and whole wheat, obtained at the cooking demonstrations, into bread and muffins to exhibit at this fair. Prizes, especially chinaware, hold a great fascination for these women.

In October a school lunch was provided five days a week to sixty school children. Upon weighing and measuring them, it was found that about fifty per cent were underweight for their age, while a lesser number were underweight for height. At first it was difficult to induce the children to eat vegetables, but they soon learned to like them, especially spinach, cabbage and onions; tomatoes were the only vegetable for which they found it difficult to cultivate a taste. These children made surprising gains, some increasing their weight from as much as four to six pounds the first week. In December the lunch had to be discontinued for a few weeks, due to a severe epidemic of measles, but it was continued again in the early spring and the manner in which the children gained weight

and changed in appearance was amazing. Many parents commented on how "rosy the children had come through the hard winter."

A statistical summary of the results of this study (table 2) is not strikingly different from what one might expect in any group of children from similar types of homes. In fact the average figures indicate practically normal weight for height in the first two age groups, with a striking drop from the normal in the adolescent groups of both girls and boys. The average gains, made during the eight months when the school lunch was offered, exceeded the expected annual gain in the first two age groups, but only equaled or was less than the expected in the adolescent groups. Thus the younger groups appeared to respond better to the

TABLE 2

School lunch project

NUMBER	AGE		AVERAGE HEIGHT*	AVERAGE NORMAL WEIGHT*	AVERAGE ACTUAL WEIGHT		GAIN IN 8 MONTHS	EXPECTED ANNUAL GAIN*
	Range	Average			October 6	June 3		
	years	*years*						
Boys								
8	4–8	6.5	Medium	47.0	47.0	54.2	7.2	4.0
10	9–11	10.1	Short	61.5	61.2	68.2	7.0	4.6
11	12–15	13.0	Short	88.0	81.0	90.0	9.0	9.0
Girls								
7	4–7	5.8	Short	40.0	42.0	48.4	6.4	4.0
9	8–10	9.2	Medium	64.0	62.0	70.4	8.4	7.0
7	11–13	11.7	Medium	93.0	80.7	89.4	8.7	11.0

* Calculated from Baldwin—Wood Weight—Height—Age tables.

improved nutritional regimen, although all showed definite benefit that is not apparent from these statistics.

Throughout the winter months the nutritionist visited as many coves as possible, holding food demonstrations and giving health talks. These demonstrations urged the necessity of vegetables and whole grain products and emphasized sanitary methods of caring for milk, since more and more of the people were acquiring cows. On this northern coast, where two to three months is the maximum growing season, gardening has been rather a discouraging occupation. A great deal of time was therefore spent in home visits to arouse interest in gardens and in the means of overcoming difficulties. More and more of these people are now beginning to realize that their future living must come from the soil rather than from the sea. As spring approached the nutritionist

held meetings in every cove again urging the people to clear and fence ground ready for gardens. Seeds were obtained from a reliable company in the United States and were available through the Mission Store. Cabbage plants and seed potatoes were also available and the second spring found most of the people increasing their garden space as much as from five to seven times. They were surprised to find what excellent products could be raised and seemed to like the taste of the various vegetables. More recent reports from the coast indicate that this year (1932) even greater interest is being taken in improving gardens; the nurse in charge reports that food shortage was much less critical because of the garden produce which had been stored.

Results of the year's work may seem limited, but the whole field of health and nutrition was strange to these people. However, there was a decided increase in the consumption of whole wheat flour and the women and children seemed to realize better the benefit of gathering and using the native berries. The most outstanding result was the increased interest in agriculture. A generous supply of garden seeds is to be furnished each spring for several years in an effort to encourage and firmly establish these budding agricultural efforts. The people are learning more and more that good nutrition and future health are dependent upon their own efforts to better their living conditions and that the government dole is an uncertain and unsatisfactory solution to their problems. Better health, in spite of economic handicaps, must be the slogan for work in the North where conditions yet are far from ideal, and bigger gardens, more vegetables and milk will go a long way towards solving the problem.

Acknowledgment is hereby made of the interest and support given by friends of the International Grenfell Association who made this nutrition study possible.

EDITORIAL

An Opportunity for Service

Not since the days of the World War has there been a more urgent call to service on the part of trained women, than is now being made in behalf of the millions of unemployed and their suffering families. The attention of dietitians is directed to the opportunity open to them through enrollment in the Red Cross Dietitians' Reserve Corps, through which they may enlist for service both of an emergency nature, in the present fight against economic depression, and a continuing service in that they become a part of an army reserve which could be called into action should the armed forces of the nation be mobilized.

The Red Cross enrollment of dietitians dates back to the days of the World War, has been continued each year, and serves as a reserve corps for the Army and Navy in times of war; it also provides a roster from which the Red Cross may draw necessary trained workers in time of great disaster. This year an effort is being made to enroll 500 dietitians, in line with a suggestion from the Surgeon General of the United States Army who has stated that a reserve composed of a lesser number of trained dietitians would not be effective in time of emergency.

To those enrolled, the Red Cross also offers a place for vital service through its community chapters. Many such dietitian volunteers have aided in preparing food budgets for relief funds, diets for veterans and their families or other ill persons, and have served in directing plans for canteens.

Dietitians who are not enrolled are urged to send for an application blank to the Nutrition Consultant, American Red Cross, Washington, D. C. Qualifications are graduation from an accredited school of home economics, and hospital training and experience. The Red Cross is the only volunteer organization authorized to assist the armed forces of the United States in time of war, and other organizations wishing to give service must do so through the Red Cross. Should an emergency arise many would wish to offer their services. The time to do so, however, is in advance of such an eventuality.

Food Clinics

Food Clinics have become an established part of the dietary departments of hospitals. They have been recognized further by the Professional Education Section of the American Dietetic Association in that

student dietitians are now advised to take training in localities accessible to food clinics, and medical, dental and social service schools are using them in students' training. There has been an awakening of interest in the ambulatory patient on the part of physicians and dietitians throughout the country, which has resulted in the establishment of new Food Clinics. For the past ten years this pioneer work has been carried on by a few, but the large attendance (nearly one hundred) at the early morning conference on such clinics at the 1932 meeting of the National Association is an indication of the growing interest.

It seems therefore that the time has come to formulate the experiences of those already in the field. The aim of the Food Clinic is (1) to aid in the dietetic treatment of the ambulatory patient by interpreting the doctor's prescription to the patient in terms of special environmental situation and dietetic needs; and (2) to serve as a teaching center for medical and dietetic students as well as for others in the field of health. For this purpose it is necessary that the Food Clinic be a centralized clinic in the out-patient department to which all cases needing dietary treatment are referred from other clinics. It must have a special place in order that the dietitian may work unhandicapped by lack of facilities and space for teaching the patient and student.

Both the teaching of the patient and the training of the student are related to the organization of the clinic, in that it influences the type of teaching which can be done. In order to teach the patient there must be: (1) *subject matter* taking up the diet in relation to the body needs, food, and hygiene (mental and physical); (2) *methods*, for the individual patient, adapted to specific needs, and for the group, utilizing for both oral instruction, demonstration and participation, visualization, the written word for home use and printed matter (teaching must be adequate to enable the patient to understand and carry out his diet); and (3) *material* necessary for these various methods of teaching. There must also be a *nutritional history* for permanent record on which should be: (1) identifying factors of the patient's social life; (2) usual food intake; and (3) prescription of the diet. These means of treatment are enumerated in order to show that time must be allowed for each patient so that the quality of the work and not the number of patients may be the criterion of good service.

The student in training develops an appreciation of the methods of the clinic and a knowledge of its relation to the institution; it teaches him how to give the ambulatory patient a diet (normal and therapeutic) in terms of body needs, food values, household measures, and menus, apply-

ing previous technical knowledge of nutrition. He is also taught methods of approach that will lead the patient to give willingly the necessary information regarding racial and environmental factors affecting food habits, home conditions, or family relations, so that the diet may be adapted in terms of these data. The student learns how to use progressive methods of teaching so that the patient will follow instructions. The student becomes conversant with material available for supplementary use, its source and cost, and the forms necessary for the organization and routine of Food Clinics. This training stresses the close relationship of such clinics with the services of health education and of the social service department, and further emphasizes the unification of all departments concerned in the treatment of the patient.

Because of its recent development, the Food Clinic has the opportunity to base its work on the principles of visual education, mental hygiene, and pedagogy, and to this end those already in existence are attractively furnished so that they supply a pleasant environment. All diseases requiring dietetic treatment are served equally by the Food Clinic, a great advance upon the days when only diabetics had this special service.

CURRENT COMMENT

Teaching Nutrition and Cookery to Nurses

Revised outlines for teaching nutrition and cookery to student nurses will be available shortly at the office of the Association. They were developed under the chairmanship of Ethel N. Thompson, with assistance of a number of dietitians and a consulting committee representing the Education Committee of the League of Nursing Education.

A preliminary survey through the State Boards of Examiners indicates that the amount of time most commonly given to teaching normal nutrition is fifteen hours, the minimum recommended by the League of Nursing Education in the Curriculum for Schools of Nursing. Fifteen two-hour laboratory periods are most frequently required for cookery paralleling this course and fifteen lecture periods in diet therapy. Since these would seem to be minimum amounts of time to be spent in teaching subject matter so essential to the training of the nurse, the outlines are based upon these allowances.

The objectives of the course in normal nutrition are to acquaint the student nurse with the relation of food to the growth of the body and to the maintenance of health, and to give her the means by which she can apply this knowledge to the development of her own physical fitness and

to that of her patients. This would include consideration of social, racial, and economic factors which largely determine the selection of food in families. Lessons in diet therapy aim to indicate the variations of the normal diet for patients requiring modifications in composition or consistency. During the cookery laboratory periods, it is expected that the student will be taught the principles of cookery, the preparation of simple meals which the nurse may be required to prepare, and the essentials of attractive tray service for the routine house diets. Costs should be emphasized throughout the course.

It is the unanimous opinion of the committee that courses in chemistry, anatomy and physiology should *precede* the course in normal nutrition. Only by this arrangement can duplication of subject matter be avoided and the limited period of time available be used to best advantage.

Similarly, the committee advises that lectures in medical nursing and internal medicine should be made prerequisites to the teaching of diet therapy, thus avoiding the duplication of instruction which should, in the nature of the case, be given by the nursing and medical professions. It suggests reviewing first the normal diet, second the modification of the diet, and third the pathological condition for which these modified diets are indicated. This seems to place the major emphasis in this course upon the dietary problems and to fix necessary and fundamental facts with as little waste of time as possible.

Diet kitchen experience of one to two months is required in most states as a substitute for laboratory practice in diet therapy. If properly organized, such experience is likely to be more valuable than laboratory practice because it involves real feeding problems. It should cover the preparation of diets for all types of modifications discussed in the diet therapy lectures, including calculation and follow-up with patients. If clinical material is insufficient, then practice diets should be prepared. Much of the nurse's time is frequently wasted by extensive preparation of routine foods and by cleaning duties which could be done more efficiently and less expensively by a diet kitchen maid.

The committee has kept in mind the fact that accomplishments of any significance in the teaching of nutrition must necessarily be the result of careful adjustment of any well organized outline to the particular situation in which it is to be used. The committee therefore suggests that the outlines be considered more as guides, than as requirements, and that changes be made according to conditions existing in the particular institution in which the course is given. In any case lectures and laboratory periods are but the beginning of the teaching in nutrition. They should

be developed and constantly integrated with the rest of the training program by ward dietitians, supervisors and head nurses.

Nutrition courses in professional schools are rapidly increasing due to the recognized importance of nutrition in all social and health work. One of the recommendations of the White House Conference on Child Health and Protection was:

> "That schools training public health and welfare workers other than nutritionists provide not less than fifteen to twenty hours of instruction covering nutrition fundamentals, food economics and budgets, and that such instruction be given by a well-trained nutritionist qualified as a teacher and who has had experience in social and health work."

The committee has therefore included an outline, arranged by Anna dePlanter Bowes and other nutritionists, for twelve two-hour lecture periods for public health nurses. It includes plans successfully used in various parts of the country which are presented here in the hope that they may serve as a guide from which deviations can be made as new facts and methods prove more acceptable.

MARY DEGARMO BRYAN.

BOOK REVIEWS

Food in Health and Disease: Preparation, Physiological Action and Therapeutic Value. By Katherine Mitchell Thoma, B.A., Director of Dietetics, Michael Reese Hospital, Chicago. Philadelphia: F. A. Davis Company, 1933. Price $2.75.

This recent book will be accepted as a welcome addition to the many books now available for teaching dietetics to nurses. In the first part the author has brought together the most recent nutritional information, and she has presented it simply and as briefly as is consistent with clarity.

In the second section, Diet in Disease, Mrs. Thoma has developed the principle that a therapeutic diet is a normal diet, modified to meet a specific need or restriction. The diet outlines, the sample menus, and the correlated menus are suggestive and will be appreciated by those who find menu-making a real problem.

The third section, Laboratory Outlines, has been well-planned and organized in such a way that a dietitian, who is attempting to follow the outline for teaching dietetics to nurses as approved by the American Dietetic Association, will find it most helpful.

ANNA E. BOLLER.

100,000,000 Guinea Pigs: Dangers in Everyday Foods, Drugs, and Cosmetics. By Arthur Kallett and F. J. Schlink. New York: The Vanguard Press, 1932. Price $2.00.

In this volume the authors, both of whom are connected with the Consumers Research Inc., announce their laudable intention "to report dangerous and largely unsuspected conditions affecting the safety of all consumers of foods, drugs, and cosmetics" and "to give the consumer some measure of defense against such conditions." Both authors are engineers—one a physicist as well—a fact that doubtless should contribute to competence for their task. Their sincerity and honesty of purpose seem unquestionable.

The writers' arguments, with regard to certain popular foods, occasionally assume the familiar biased viewpoint of the untrained observer. In one instance they have obviously listened attentively to one voice crying out against bran and other "rabbit foods," and have evaded the mass of contrary evidence submitted in 1932 by two authoritative groups of investigators. If a book of this type is to have its intended value it must above all be free from inaccuracies and reflect an unprejudiced and technically-minded viewpoint. Unfortunately, on page 190, the authors refer to the *Journal of the American Medical Association* as a "monthly journal;" and on page 192 they refer to an advertisement of a popular bran food in the same publication, in which reference is made to biological tests that have determined the safety of bran for the normal alimentary tract. The authors comment sarcastically on one of these researches. They consider such a test worthless since it was conducted on "22 rats," (The number of experimental animals actually used was 32). They consider that one might as well say that if 22 test hogs eat raw corn out of a filthy trough, it would also be a permissible type of food for the human animal. This sloppy reasoning ignores the fact that part of the work of the aforementioned study was carried out on various groups of human animals. However, it was only possible to do the histological study on the rats.

In criticising a popular brand of hardened vegetable fat they stress their theory of its indigestibility because of the high melting point of such fats, and ignore its virtue as a frying medium because of this same high melting point.

It is difficult to know what method of smoking meats the authors prefer, since on page 40 they quote Edward Oakes Jordan to the effect that "chemicals deposited by wood smoke are injurious," while on page 287 the use of artificial liquid smoke for curing hams and bacon is not to be countenanced.

The writers direct many of their barbs toward the majority of women's magazines. They champion the "too honest and forthright" Dr. Wiley, yet neglect to mention

that he was an advisor on foods, etc., for a number of years to a certain woman's magazine whose advertising they heartily criticize. One could wish that their selection of a St. George might have been more consistently made.

However, despite the evidences of somewhat hasty preparation, the book should interest thinking people, particularly those groups primarily concerned with the question of foods and drugs as they affect the public health. There undoubtedly is room for much improvement in our methods of inspecting foods. Much of what the authors have to say deserves particular attention, such as: the dangers of bovine-borne tuberculosis through milk and meat supplies; the use of lead and arsenic sprays on fruits and vegetables; excessive amounts of sulphur dioxide with dried fruits; improperly prepared bleached flour; the use of benzoate of soda and other preservatives, particularly when this encourages the use of partially decomposed products and unsanitary methods of preparation; and sodium sulphide on chopped meats to restore color and destroy odor of putrefaction. The reviewer, unfortunately, is not in a position to know how weighty the evidence behind some of these assertions is, but that they would bear further investigation is decidedly possible.

In view of the extravagant claims made by advertisers of certain drugs, tooth pastes, etc., it is pleasing to read the diatribes against certain of these, also against many of the so-called antiseptics. The writers state that 62 per cent of 128 cod liver oil preparations are below standard. The use of dangerous cosmetics, particularly depilatories, hair dyes and stains, and freckle removers, is pointed out.

The book can be commended as interesting reading.

M. P. H.

The National Cook Book. By Sheila Hibbin. New York: Harper and Brothers, 1932, pp. 452. Price $2.50.

Mrs. Hibben's book can be wholeheartedly recommended as one of the best cook books that has appeared in recent years. Its careful preparation and the interesting culinary viewpoint of the author doubtless prompted the *Saturday Review of Literature* to designate it as one of their three current recommendations a few weeks ago. The author has collected six hundred of our finest regional recipes, which should serve to reinstate a decent national pride in our own dishes. Fifty recipes have been devoted to soups, one of the somewhat neglected dishes on the average American cuisine. The book has an historic interest in that it shows the development of characteristic New England, Old South, Creole New Orleans, Dutch Pennsylvania, German Middle West and Scandinavian Northwest cookery, among others, into our accepted American dishes.

Mrs. Hibben is no admirer of Sealyham terriers "carved in whipped cream paddling on a plate of soup," nor of other ornate and tortured foods. She believes that one must know traditions of excellent food and follow standards that have stood the test of time. While the book will appeal to individuals possessing a keenly developed food discrimination, it can also be considered a practical cooking guide, since the recipes are simple and easy to follow and do not call for ingredients difficult to obtain.

M. P. H.

Furnishings and Equipment for Residence Halls. By Mary de Garmo Bryan and Etta H. Handy. New York: Columbia University, 1933, pp. 95. Price $1.00, or 80 cents each in lots of three or more.

This little booklet, prepared by recognized authorities in the field, should prove an invaluable reference to student dietitians, institutional managers, and hospital superintendents interested in the selection and purchasing of equipment. It should be very useful to those concerned with moderate cost house and food services, and has been used by several New York City hospitals in selecting food service equipment for hospital kitchens. It contains an amazing amount of information on interior finish and fixtures, furnishings and equipment used throughout the building, food service furnishings and equipment, furnishings for living and social rooms,

laundry equipment, and service spaces. Cost estimates are based on averages of prices secured from several representative firms during the summer months of 1932. The extensive bibliography has been well-prepared and seemingly covers every possible phase of the subject of large scale furnishings and equipment.

Diabetes, Its Treatment by Insulin and Diet, 5th ed. By Orlando H. Petty. Philadelphia: F. A. Davis and Co., 1931, pp. 231. Price $2.00.

That this book has reached its fifth edition since 1924 is an indication of its reception by the public. Dr. Petty has given a very thorough exposition of the diagnosis, cause, prevention and treatment of diabetes. While intended for use by the patient, the material is complete enough to meet the needs of the average physician and dietitian. The section on vitamins has been rewritten and enlarged, and the subject of obesity and diabetic hygiene has been discussed in greater detail. Twenty-one pages of sample diets for those following orthodox Jewish dietary rules are included. Food values have been corrected, according to the figures of the United States Department of Agriculture up to January 1931. The book can be recommended as a safe reference.

Publications on Low Cost Diet. A single copy of a memorandum listing a bibliography of low cost dietary data is available from the Social Work Publicity Council, 130 E. 22nd St., New York City, for six cents.

This memorandum contains material which may be secured easily and cheaply. Critical advice was given by home economists who have had much experience with emergency diet problems. Revisions of the memorandum as it now stands will appear in the *News Bulletin* of Social Work Publicity Council, and in the education and publicity department of the *American Journal of Public Health*. Most of the listed material is available for inspection at the Library of the Russell Sage Foundation at the address of the Social Work Publicity Council. Some of the material is intended for distribution to social workers for guidance in helping clients. Other publications are for administrators who plan food budgets in relation to available funds. In practically every state the state agricultural college, the state extension division, or other centers supply material for workers and housewives.

Family Food Budgets for the Use of Relief Agencies. Children's Bureau, U. S. Department of Labor, and Bureau of Home Economics, U. S. Department of Agriculture, Washington, D. C. Washington, 1932. 8 pp.

This little folder which is really a work sheet containing sample market orders for families of different sizes, is intended to assist relief workers in their task of distribution. One set of orders provides "Adequate diets at minimum cost, containing ample margin of safety in protective and other foods," and the other set suggests the essentials of "Restricted diets for emergency use, containing only the 'irreducible amounts' of protective and other foods." The folder is available free to social agencies, dietitians, and relief workers on request to either of the collaborating bureaus.

A pamphlet on "The Vitamin A and Vitamin E Content of Field-Cured and Artificially Cured Alfalfa Hay" by I. L. Hathaway, H. P. Davis, and R. R. Graves, has been received from the Nebraska Agricultural Experiment Station.

CURRENT LITERATURE

KATHLEEN M. LEWIS

American Journal Diseases of Children

Vol. 45, January, 1933

* Raw apple diet in the treatment of diarrheal conditions in children. T. L. Birnberg.—p. 18.

Efficiency of New Orleans sunshine in preventing rickets in rats. H. Laurens and H. S. Mayerson.—p. 66.

* Effects of cod liver oil—skimmed milk feeding on bones of infants. H. E. Irish.—p. 96.

RAW APPLE DIET IN THE TREATMENT OF DIARRHEAL CONDITIONS IN CHILDREN. The author has treated 70 cases of various types of diarrhea by the raw apple diet with satisfactory results in 88 per cent of the cases. The child receives from one to four tablespoons or more of scraped raw apples every hour or two for forty-eight hours, depending upon the age of the individual. There is then a gradual return to the normal diet. The effectiveness of this regimen has been attributed to such factors as the tannic acid content, the non-irritating action of the pulp, the malic acid, and also the pectin content, all of these factors having various chemical or mechanical effects in the digestive system.

THE EFFECT OF COD LIVER OIL-SKIMMED MILK FEEDINGS ON THE BONES OF INFANTS. Clinical observation has shown that rachitic conditions, as observed by roentgenograms, appear in infants who have had cod liver oil treatment. The history of the patient and the associated conditions of rickets, such as involvement of the nervous system, ruddy robust appearance and others, are not suggestive of rickets. It seems, therefore, that cod liver oil may contribute to the overgrowth of the infant and cause hypertrophic manifestations with hypercalcification similar to healed rickets.

American Journal of Physiology

Vol. 102, December, 1932

Studies in the B vitamins. Statistical comparison of small and large litters of rats on a normal stock diet. C. U. Moore, H. B. Plymate, B. J. Andrew and V. White.—p. 566.

Studies in the B vitamins. Statistical comparison of rat litters on normal stock diets with litters on synthetic diets containing varying amounts of the vitamin B complex and combinations of B_1 and B_2. C. U. Moore, H. B. Plymate, B. J. Andrew and V. White.—p. 573.

* Studies in the B vitamins. Evidence of a third vitamin B factor in yeast (B_4) as shown by growth curves and clinical symptoms of first and second litter of young of mothers raised on synthetic B_1 and B_2 diets. C. U. Moore, H. B. Plymate and B. J. Andrew.—p. 581.

Studies in the B vitamins. A report of litters obtained on a diet in which feces were supplied as a sole source of vitamin B. C. U. Moore, H. B. Plymate and V. White.—p. 593.

Studies in the B vitamins. A study of myelin degeneration in the peripheral nerves of rats as associated with low vitamin B content of diet. C. U. Moore, H. B. Plymate and B. J. Andrew.—p. 598.

* Studies in the B vitamins. Further consideration of pyloric obstruction in rats. C. U. Moore and H. B. Plymate.—p. 605.

Vol. 103, January, 1933

* Liver glycogen storage in diabetic animals. R. C. Bodo, F. C. Tui and L. Farber.—p. 18.

Fresh and dried yeast as sources of vitamin B. R. Walker and E. M. Nelson.—p. 25.

Studies on the physiology of the liver. The effect of insulin in the blood sugar following total removal of the pancreas and liver. F. C. Mann and J. L. Bollman.—p. 45.

STUDIES IN THE B VITAMINS. In the first litters of rats deaths occurred on diets previously considered adequate in B_1 and B_2, while in the second litters, animals died on diets contining relatively a very high percentage of B_1 and B_2 preparation. Reader describes the same symptoms noted in three rats (hunched posture, greasy yellow fur, abnormal rolling gait) as a clinical picture of B_4 deficiency. Both preparations of B_1 and B_2 must have contained small quantities of B_4. The storage of B_4 in the stock animals permitted normal development of mothers used for this experiment. Lesser storage of B_4 in first, and again in second litters, resulted in symptoms of B_4 deficiency. Since young from both litters immediately responded when supplied with a minimal amount of yeast, and since inadequate

growth resulted from insufficiency in both litters, B_4 is considered a necessary factor for continued growth in rats. Requirements of the B_4 factor is increased for the production of litters; however, the B_4 factor is present in mothers' milk in adequate amounts to produce normal weight gain in young to weaning, even when the maternal diet is relatively deficient in the accessory.

STUDIES IN B VITAMINS. When the method of giving B vitamin in the diet was changed from 2 per cent yeast mixture with basal diet, to 0.2 gm. of yeast fed daily before basal diet, symptoms such as pyloric obstruction, hemorrhage of young and mother and high percentage of deaths with terminal paralysis were no longer evident. Two males early evinced gastric dilation; the first was relieved by an injection and later an oral administration of small quantities of yeast, but died suddenly after partial recovery; the second was relieved in two instances by an injection of a filtrate of vitamin B concentrate and this rat completely recovered when restored to an adequate diet B_1 and B_2. None of the females showed gastric dilation, as did three out of four males. It would appear that a condition of pylorospasm probably brought about by lack of vitamin B_1 was concerned, since a complete cure was occasioned by treatment of afflicted animals with B_1 concentrate.

LIVER GLYCOGEN STORAGE IN DIABETIC ANIMALS. It has been found in experiments on depancreatinized dogs that no glycogen is stored in the liver on a forty-eight hour fast, but if sugar is given by infusion or injection, glycogen is stored up to about one per cent. Glycogen is increased through the use of insulin and sugar. When sugar alone is administered, there is no appreciable rise in the amounts of stored glycogen, showing that insulin is necessary for glycogen storage. A possible explanation is that insulin is stored, or that insulin acts only as a catalytic agent, hastening storage.

American Journal Public Health

Vol. 22, December, 1932

* The rôle of activated milk in the anti-rickets campaign. A. F. Hess.—p. 1215.

Protective value for infants of various types of vitamin D fortified milk. J. M. Mitchell, J. Eiman, D. V. Whipple and J. Stokes Jr.—p. 1220.

Vol. 23, January, 1933

The addition of vitamin D concentrate to milk. T. F. Zucker.—p. 10.

* Nutritive value of cranberries. C. R. Fellers.—p. 13.

THE RÔLE OF ACTIVATED MILK IN THE ANTI-RICKETS CAMPAIGN. Activated milk has been singled out for prophylactic use in the anti-rickets campaign because it provides a therapeutic measure which is automatic, in that the specific agent is embodied in the food which is essential for the nutrition of the infant. Milk previously had been activated by feeding cows activated yeast, but this method is not suitable for the milk supply of large communities. The irradiation takes place at the same time as pasteurization, for a period of 16 seconds. Clinical tests on infants, six months and under, in New York City for two winters established that this milk will prevent rickets almost without exception, and especially so in Negro babies who are exceptionally susceptible.

NUTRITIVE VALUE OF CRANBERRIES. Cranberries are valuable in the diet chiefly for the high vitamin C, iodine and energy values. The ash is slightly basic and contains significant amounts of potassium, phosphorus, manganese and iron. The blood alkaline reserve of the body is not lowered by moderate or generous servings of cranberry sauce, but very large quantities decrease it significantly. Servings of five ounces or less produce little change in either pH or hippuric acid values. Fresh and frozen cranberries and whole fruit jellied sauce are excellent sources of vitamin C and contain significant amounts of vitamin A. Vitamins B, D and G are not present in appreciable amounts.

Hospital Management

Vol. 34, December, 1932

Can hospital chefs cook?—p. 23.

What Chicago hospitals pay for milk.—p. 54.

Factors influencing dietary service. H. Hotvedt.—p. 56.

Hotel Monthly

Vol. 40, December, 1932

Styling food. J. L. Hennessy.—p. 50.
Spices and nuts. A. Shircliffe.—p. 54.

Vol. 41, January, 1933

Spices and nuts. A. Shircliffe.—p. 45.

Journal American Medical Association

Vol. 99, December 31, 1932

Anemia of pregnancy with enlargement of the spleen. L. E. Hamlin.—p. 2264.

Vol. 100, January 14, 1933

Observations on the effect of insulin in thin persons. H. Blotner.—p. 88.

Vol. 100, January 21, 1933

* Treatment of pernicious anemia. R. S. Morris, L. Schiff, J. H. Foulger, M. L. Rich and J. E. Sherman.—p. 171.

A simple method for writing a scientific diet. W. S. Collens.—p. 184.

Vol. 100, January 28, 1933

The Federal food and drugs act and the physician. F. J. Cullen.—p. 249.

TREATMENT OF PERNICIOUS ANEMIA. Riddle and Sturgis have shown that a 30 vial dose of liver extract produces a therapeutic effect on pernicious anemia comparable to administering a three vial dose every day for ten days. The Addison hormone (concentrated gastric juice) taken from humans and from swine, has been injected intramuscularly and the red blood corpuscle count and hemoglobin have begun to increase steadily until practically normal figures are reached, the bone marrow is intensively stimulated. It seems probable that a single intramuscular injection of concentrated gastric juice taken from swine may be sufficient to bring about complete remission in pernicious anemia. It is not unreasonable to predict that periodic treatments at intervals of two or three months may maintain a normal blood count of hemoglobin in individuals suffering from pernicious anemia.

Journal Biological Chemistry

Vol. 99, December, 1932

* The effect of the ingestion of a large amount of fat and of a balanced meal on the blood lipids of normal man. G. B. Man and E. F. Gildea.—p. 61.
* The antiricketic potency of eggs from hens receiving massive doses of activated ergosterol. F. G. McDonald and O. N. Massengale.—p. 79.

Studies on vitamin G with special reference to protein intake. H. C. Sherman and I. A. Derbigny.—p. 165.

The sparing action of fat on vitamin B. Is it necessary for fat to interact with vitamin B in the alimentary canal to exert its sparing effect? H. M. Evans and S. Lepkovsky.—p. 235.

* Iron and copper in liver and liver extracts. A. E. Meyer and C. Eggert.—p. 265.
* Ketosis during fasting in Eskimos.—p. 279.

Vol. 99, January, 1933

* The effect of the prolonged feeding of a milk—iron—copper diet to rats. F. A. Underhill, J. M. Orten, E. R. Mugrage and R. C. Lewis.—p. 469.
* Cobalt in animal nutrition. F. J. Stare and C. A. Elvehjem.—p. 473.

Metabolism of women during the reproductive cycle. Nitrogen utilization. H. A. Hunscher, E. Donelson, B. Nims, F. Kenyon and I. G. Macie.—p. 507.

On the influence of vitamin B and of iodine on the calcium and phosphorus metabolism of rabbits with hyperplastic thyroids. M. Sandberg and O. M. Holly.—p. 547.

THE EFFECT OF THE INGESTION OF A LARGE AMOUNT OF FAT AND OF A BALANCED MEAL ON THE BLOOD LIPIDS OF NORMAL MAN. The ingestion of 3.5 to 4 gm. of fat per kilo of body weight by nine normal men and women is shown to produce a marked rise in serum fatty acids and moderate increase in the serum phospholipids. The ingestion of a balanced meal, containing at least 0.6 gm. of fat per kilo and with carbohydrate plus protein slightly exceeding the weight of the fat, is found to produce a rise in the serum fatty acids of normal men and women.

THE ANTIRICKETIC POTENCY OF EGGS FROM HENS RECEIVING MASSIVE DOSES OF ACTIVATED ERGOSTEROL. The egg yolk oil from pullets receiving 2 per cent of cod liver oil, had a cod liver oil vitamin D coefficient of 0.7. The substitution of an irradiated ergosterol solution 10,000 times as potent as the cod liver oil resulted in an increase of only 185 times in the vitamin D potency of the yolk oil, as measured by tests on rats. The egg yolk oil from the pullets receiving the massive dose of irradiated ergosterol was administered to baby chicks at levels equivalent to 2 per cent and to 25 per cent of cod liver oil, as measured by tests on rats. It was less effective at these levels than 2 per cent of cod liver oil.

IRON AND COPPER IN LIVER AND LIVER EXTRACTS. In the livers investigated, horse, hog and dog livers are uniformly high in iron, whereas beef liver contains considerably less. The copper is highest in beef liver, less in dog, horse and hog liver. Only a part of these metals can be extracted with water. The fraction obtained with higher grade alcohol (up to 93 per cent) contains less copper and very little iron.

KETOSIS DURING FASTING IN ESKIMOS. The analyses of urine specimens collected from three Eskimo subjects during a seven day fast demonstrate that these people develop a lesser degree of ketosis on fasting than do average white persons living in the temperate zones. The experimental findings on three successive fasting groups of Eskimos seem to indicate that Eskimos can burn considerable fat to completion without the aid of carbohydrate.

THE EFFECT OF THE PROLONGED FEEDING OF A MILK-IRON-COPPER DIET TO RATS. The work of several investigators has established the fact that rats weaned on a milk diet supplemented by iron develop a severe nutritional anemia; whereas the addition of a trace of copper to this diet permits the anemia to maintain an approximately normal hemoglobin level and to grow satisfactorily.

COBALT IN ANIMAL NUTRITION. The whole body of rats fed a diet of milk, iron, copper and manganese was found to contain less than 0.01 mg. of cobalt. Rats fed the same diet plus cobalt contained amounts of cobalt proportional to the amount fed. The presence of 0.04 to 0.05 mg. of cobalt in the entire body of a rat was sufficient to produce a decided polycythemia. No cobalt was found in tissues from pigs fed a milk, iron, copper, manganese diet, but definite quantities were detected in all the tissues taken from pigs on the same diet plus cobalt.

Journal Home Economics

Vol. 25, January, 1933

Vitamin A in six varieties of frozen cherries. M. T. Potter and M. A. Dickson.—p. 47.
The winesap apple as a source of vitamin C. M. T. Potter.—p. 52.

Journal of Nutrition

Vol. 6, January, 1933

The effect of glucose and of fructose on the human respiratory quotient and alveolar air. T. M. Carpenter and R. C. Lee.—p. 55.
* A comparison of apricots and their carotene equivalent as sources of vitamin A. A. F. Morgan and E. O. Madsen.—p. 82.
* The copper, iron and manganese content of fish. T. B. Parks and E. R. Rose.—p. 95.
The vitamin A content of yellow tissued and white tissued apples. M. T. Potter.—p. 99.

A COMPARISON OF APRICOTS AND THEIR CAROTENE EQUIVALENT AS SOURCES OF VITAMIN A. The carotene content of fresh-frozen, sulfured sun-dried apricots of similar origin was determined by pyridine and by acetone-ether extraction followed by colorimetric estimation. The pyridine was found to extract the dried samples more completely and easily than did the acetone-ether. The loss of carotene in the dried fruit was 36 and 41 per cent. The vitamin A activity of these fruit samples was determined biologically and the loss of vitamin in the dried specimens was found to be 50 to 75 per cent. The vitamin A activity of crude carotene (melting point 162–164) was found to be less than that of the crystalline carotene (melting point 180) made from it. The apricots were seen to yield vitamin A in nearly the amounts indicated by their carotene content, when compared with the vitamin value of similar doses of the crystalline carotene. This may be tentatively interpreted to mean that not only all of the carotene of the fruit is available for transformation into vitamin A in the animal body, but also that no other constituents of the fruit is capable of such transformation. Whether the carotene of other plant products is capable of yielding such a large proportion of vitamin A can only be determined by further experiments.

THE COPPER, IRON, AND MANGANESE CONTENT OF FISH. Twenty species of fresh and salt water fish have been tested for their copper, iron and manganese content. In both fresh and salt water fish the average copper content is about 2.5 mg. per kilo of

material. Salt water fish contain about twelve per cent more iron than fresh water fish. Fish having dark-colored tissue contain about seventy-five per cent more iron than fish with light-colored tissue. Small amounts of manganese are contained in fish muscle.

Modern Hospital

Vol. 40, January, 1933

When hospital silverware needs attention. R. P. Sloan.—p. 108.

Homemade versus ready-made ice cream comparative costs. C. P. Wright.—p. 108.

A hospital kitchen that does double duty. E. M. Shrader.—p. 112.

NEWS NOTES

American Dietetic Association. The 1933 annual meeting will be held October 9–13, at the Palmer House, Chicago.

The JOURNAL has just been informed that the following appointments have been made in the Community Education Section: Committee on Child Health, Anna DePlanter Bowes, chairman; Committee on the Work of the Dietitian in School and College Cafeterias and Dining Halls, Mary E. Diefenderfer, chairman; Diet Costs, Marna Weltman.

A number of state association meetings have been scheduled since the first of the year. The Illinois Dietetic Association sent out announcements for their meeting at the Belden Stratford, Chicago, February 10 and 11. A past reputation for wonderful meetings combined with Mr. Shircliffe's hotel and marvelous railroad rates insured the good attendance at this meeting. The California State Association met with the Western Hospital Association, February 22, and the Iowa State Association meets with the Iowa Hospital Association at Marshalltown, April 19 and 20. This state group is preparing a permanent exhibit for the Hospital Association showing the work of the hospitals in the state. The Tri-state Association met in Birmingham, Alabama, February 18. Georgia has recently joined forces with this group.

Through an oversight, the four delegates from Georgia were omitted from the list of convention registrants on page 437 of the January JOURNAL. Number 4 under the major in institution management *Association Reports* should read "Inorganic *and* organic chemistry" rather than "inorganic *or* organic chemistry."

American Home Economics Association. The twenty-sixth annual meeting will be held in Milwaukee, Wisconsin, June 26 to 30, 1933, with the Hotel Schroeder as headquarters. The central theme of the discussions will be "Home Economics in a Modern World." The program will include two public evening sessions addressed by prominent speakers on important phases of education for homemaking, with special reference to the adaptation of home life to present conditions. Opportunity will also be provided for members particularly interested in food, clothing, family economics, family relationships, or the house and its management to hear these subjects presented by specialists and to join in informal discussions.

The business of the Association will be transacted at the regular annual business session and at two meetings of the Council. Home economics and radio will be the subject of a special conference on June 26. The chairman of local arrangements is Ella Babcock, Milwaukee Public Schools, 1111 North 10th Street, Milwaukee, Wisconsin.

Chicago Dietetic Association. For the past few years the program of one meeting of the year has been given by the members of the Association. At the December meeting reports were given by those who assisted in the preparation of reports for the national committees. Nell Taylor, Michael Reese Hospital, reported on the "Study of Dish Breakage"; "A Survey of the Per Capita Use of Foods in Different Types of Institutions" was given by Ella Eck of University Clinics, and Frances Floore, St. Luke's Hospital, discussed "Feeding the Diabetic Child."

At the January meeting Dr. Laurence Mayers of St. Luke's Hospital presented the topic "Obesity through the Cycles of Life."

The results of the election of officers were as follows: President, Lida Jamison, Chicago Dietetic Supply House; Vice-President, Kathryn McHenry, Edward Hines Hospital; Secretary, Beulah Hunzicker, Presbyterian Hospital, and Treasurer, Grace Meyers, Cook County Hospital. The following were appointed chairmen of the standing committees: Membership, Elizabeth Tuft, Wesley Memorial Hospital; Revisions, Elsbeth Hennecke, Presbyterian Hospital; Publication, Pearl Lewis, Consulting Dietitian, associated with Dr. Clifford Barborka; and Publicity, Frances Floore, St. Luke's Hospital.

Edna Klumb, formerly of St. Mary's Hospital of Rochester, Minnesota, is now at the Columbus Hospital, Chicago.

Mrs. Rose Straka Fowler of the Chicago

Dietetic Supply House announces the arrival of a daughter, Carolyn Anne.

The Cincinnati Dietetic Association. Dr. Leon Schiff, clinician at the Cincinnati General Hospital, spoke recently to members of the association on the use of "addisin" in pernicious anemia. Much of the data for Dr. Schiff's report was taken from the work done in the laboratories of the General Hospital and Medical College.

At the November meeting interesting and descriptive reports on the convention were given by Mrs. Reineke, Mrs. Ylvilsaker, Miss Holle, Miss Senteff and Miss Edgington, who attended the convention in New York. During the latter part of this meeting, there was much response to the Round Table Discussions, which resulted in the exchange of many helpful ideas.

In keeping with the holiday season, a bridge party at the Business and Professional Women's Club was planned for December. After prizes were distributed, the members were seated at a long table, attractively decorated in a Christmas motif, and delicious refreshments were served.

The Public Health Federation executives have for several years asked the assistance of Cincinnati dietetians in the planning of food budgets and menus for needy families. At the January meeting, Mr. Bleeker Marquette Executive Secretary of the Public Health Federation, gave an interesting talk on the Federation and its activities.

Laura Bryant was hostess at a joint meeting of the Cincinnati Dietetic and Home Economics Associations in February. The members assembled in the demonstration kitchen of the Union Gas and Electric Company where Mary Dahnke gave an instructive talk and demonstration.

The Greater New York Dietetic Association held its first meeting of the new year January 9, at the New York Post Graduate Medical School and Hospital. Dr. H. O. Mosenthal who is associated with the New York Post Graduate Hospital discussed "Normal Protein Intake and Protein Intake in Nephritis." The meeting was well-attended.

To swell the contribution toward the Unemployment Fund, special foreign dinners have been planned. On January 26, Madame Metzelthin sponsored one of her famous Chinese dinners; over one hundred members attended and enjoyed every minute. As a result of the contributions and dinners, over one hundred dollars has been raised toward the fund. Trips to the Chrysler Tower and through the largest Schrafft's kitchen, as well as airplane trips over New York, have also been conducted to assist in raising money.

The February meeting was held at the Hotel Beverly, when Mr. Ordway Tead of Columbia University spoke on "How to get employees' coöperation in institutions."

The Iowa State Dietetic Association held its fall meeting on the Iowa State College Campus, November 16 and 17. At the short business meeting the President appointed Evelyn Fresk to the vacancy as treasurer. The following were appointed to the nominating committee: Elizabeth Hintz, Gwen Bingaman and Clara Robinson.

Dr. Pearl Swanson of the Foods and Nutrition Department gave an interesting paper on nutritional research at Iowa State College. Dr. Kate Daum gave a report of the New York convention. Dorothy Anderson told of the health education at Iowa State College. Later the group visited the College Hospital and were guests for tea.

Dinner was held in the Memorial Union. There was a round table discussion of the newer diets used by the hospitals. Louise L'Engle of the foods and nutrition staff told of her trip to the Carribean Sea.

On November 17, Dr. Victor Nelson of the chemistry department spoke on chemistry in nutrition and illustrated his talk with slides. Elsie Guthrie gave a report of her master's theses "Student Help in Dormitories." Muscular energy was discussed by Dr. Erma Smith of the physiology department. Fern Gleiser, head of the Institutional Management Department spoke on food budgeting and organization of the cooperative dormitories.

Luncheon was served in the Home Economics Tearoom. After luncheon there was a tour of the Home Economics Building.

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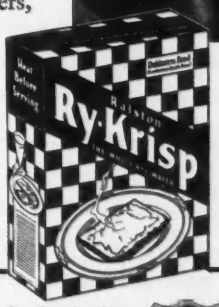

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The rat laboratory, of which Dr. Swanson had spoken, was especially interesting.

The meeting was very well-attended and many former students enjoyed returning to the campus, while strangers were glad to have this opportunity to visit it for the first time.

The Massachusetts Dietetic Association is continuing its semi-monthly meetings, alternating field trips and business meetings. In January Dr. Alexander Marble of the New England Deaconess Hospital discussed "Present Day Views Regarding the Dietary Treatment of Diabetes Mellitus." At the March meeting Ellen A. Riley of the Women's Educational and Industrial Union, Boston, will give an address on "Food Service in Various Types of Organizations."

The Association blossomed out socially this month, first with a tea at the Lincolnshire Hotel in honor of Mrs. Quindara Oliver Dodge, President-Elect of the American Dietetic Association. Mrs. Charlotte Schwamb, President of the Massachusetts Association, received with Mrs. Dodge, and Dr. Blood of Simmons College and Mrs. Octavia Hall Smilie a former President of the Massachusetts Association poured.

On February 14 a Valentine Bridge Party was held at the Copley-Plaza Hotel. There were fifteen tables and the tallies, decorations and refreshments were in the valentine motif.

The Milwaukee Dietetic Association held a Christmas party at the Milwaukee Children's Hospital in December. Dinner was served by Katherine Gallauer who represents a group of Milwaukee wholesale food dealers. Mrs. Gallauer gave a brief history of the development of her advertising plan and pointed out the important features of each article of food which had been served.

Alice Brenckle was hostess to the association in January at St. Mary's Hospital. Benjamin Eichelberg of the Schuster Stores demonstrated "The Foreign Art of Cookery." Mr. Eichelberg's theme seemed to be the glorification of fruits and vegetables, for he transformed ordinary turnips and carrots into beautiful bouquets and with a few strokes of a knife made gardens of apples and oranges. Luncheon was served after the lecture by members of the hospital staff.

In February a dinner meeting was held at Milwaukee County General Hospital, The subject of the evening was "What are other Home Economics Groups doing for the Unemployment Relief?" Speakers were: Hedwig Poehler, Director of Nutrition City Health Department; E. Tonnigan, Director of Home Economics Milwaukee Vocational Schools; Ella Babcock, Supervisor of Home Economics Milwaukee Vocational Schools; and Margaret Tyler, Dietitian Y. W. C. A. Ada Lothe and Esther Deppe were in charge of arrangements.

Nell Clausen was invited to give a demonstration of the analysis and use of Milwaukee County's Outdoor Relief Food Allowance for the Institute for Workers in Public Unemployment Relief Agencies at Madison February 2. She presented a similiar problem before the doctors and visiting nurses of the out-patient department of the Milwaukee Children's Hospital. The Institute was held under the auspices of the Wisconsin industrial commission.

Washington Dietetic Association. The January meeting of the Western Washington branch of the American Dietetic Association was held at the Washington Athletic Club, in Seattle, Washington, January 20. Mr. Darwin Meisnest, manager of the club, spoke on business administration. After a brief discussion, Margaret Coughlin, dietitian at the club, told of her work there. Members were then shown through the dietary department of the club.

Mabel Flanley has been enjoying a holiday in California.

Ruby Kayser, formerly at Harborview Hospital, has accepted a position in Colorado. Edna Cox, recently graduated from Harborview, succeeds Miss Kayser.

The Western Pennsylvania Dietetic Association conducted a Round Table discussion on marketing at its January meeting. This discussion was led by Miss Wilson and followed a talk by Mary Hale Martin on "Buying Canned Foods Wisely." At the dinner

Bran may be recommended safely for the common type of constipation

ATONIC constipation, the most prevalent type, is usually the result of sedentary habits, and insufficient fiber in the diet.

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meeting in February the Association viewed films on the subject of coffee. The March meeting is to be devoted to a consideration of equipment and cleansing agents, including a display of new equipment. In April Dr. McNall will give a paper on "Dietary Treatment in Tuberculosis."

Word has been received of the death, late in December, of Nell Louise Oliver, head dietitian of Parkland Hospital, Dallas, Texas. Miss Oliver was an active member of the Association, a graduate of the College of Industrial Arts at Denton, Texas, and of the student training course at Fifth Avenue Hospital, New York City. She had been ill with pneumonia about a week before her death.

An interesting letter has been received from Georgetta White of the Freedmen's Hospital in Washington, in which she comments on how much inspiration the dietitians received from attending the convention in New York. A program of a recent symposium on infant feeding, in which eight nurses and dietitians took part, was enclosed.

Announcement has come from Bologna, Italy, of a comprehensive "Bibliographical Collection of Medical Sciences," which should be of use to research students. Students may subscribe to bibliographical information on the special subjects in which they are interested. Those interested may receive further information by addressing Bibliographical Collection of Medical Sciences, via Farini n.6, Bologna, Italie.

A newspaper clipping has been received, telling of the work of the North End Clinic in Detroit, which is supported by the Detroit Community Fund and is an affiliated agency of the Jewish Welfare Federation. This clinic is under the supervision of Rhea Shulman, a former student of Michael Reese Hospital in Chicago. In order to teach the patients how to get the best value out of their food dollar, Miss Shulman prepares monthly food displays, supplemented by placards and leaflets. A recent display illustrated adequate daily menus at a cost of eleven cents per person per day. The Clinic also distributes pamphlets on food economy and suggestions from United States Government bulletins. The Clinic makes frequent use of the menus and inexpensive recipes which were devised by Dr. Icie Macy and her associates. In addition to displays of economy diets in health and certain diseases, a display of interesting school lunch boxes was arranged by Miss Shulman.

The Charity Organization Department of the Russell Sage Foundation, following a country-wide survey of relief methods, registers its disapproval of the central commissary for supplying food to the destitute. The director of this organization believes that it is most frequently advisable to make favorable trade arrangements with local dealers rather than setting up new organizations to handle the relief problem.

The Buffalo Dietetic Association was organized in 1930 with twenty-four members, and Ursula S. Senn of the Buffalo City Hospital, as President for the first two years. Previous to this time, dietitians had gathered on various occasions for educational and social meetings. The dietitians of ten Buffalo hospitals as well as dietitians from three other hospitals in the county have manifested a growing interest in the organization.

This year, under the leadership of Mrs. Helen Kite of the Millard Fillmore Hospital, there have been three very popular meetings. At the second meeting Anne H. Stewart, now at the Buffalo General Hospital and recently returned from Istanbul, Turkey, where she had taught Home Economics in the American College for Women, spoke on "Turkish Customs and Life." Minna Roese of Kenmore, New York, was hostess for the evening.

Five meetings are to be held this year which promise to be well-attended by both commercial and hospital dietitians. The New York State Dietetic Association is to meet at Buffalo this spring.

Oregon Dietetic Association. At the January meeting three hospital superintendents from the three hospitals affiliated with our student training course for dietitians were guests of the Association. Those present

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were Mrs. Emma Jones from Multnomah County Hospital, and Miss Grace Phelps from Doernbecher Hospital. Miss Caroline Davis of Good Samaritan Hospital was unable to attend on account of illness. Besides the local members, Mrs. Jessamine C. Williams and Georgia Bibee from Oregon State College at Corvallis attended the meeting.

Dinner was served at the "Sign of the Rose." Following the dinner, Elizabeth Stewart, president of the Oregon State Association, presided at a round table discussion, where various problems were discussed. Some excellent ideas were developed from this meeting which should materialize in the future.

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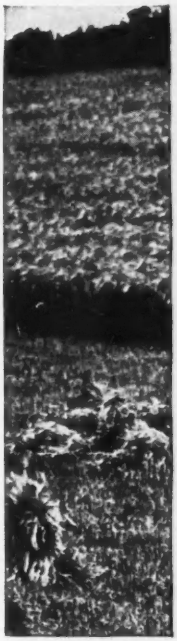

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WHO'S WHO IN THIS ISSUE

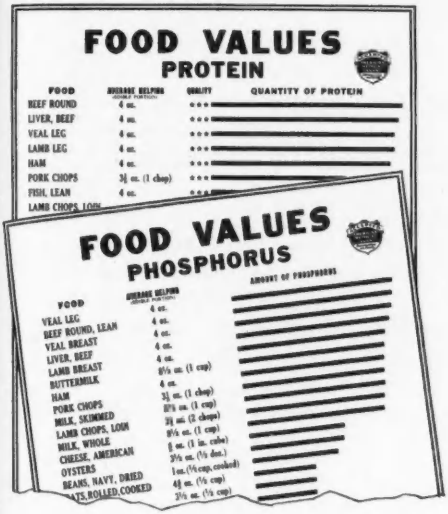
CLIFFORD J. BARBORKA recently went to Chicago from the Mayo Clinic where he was consulting physician for eleven years. He is now in the Department of Medicine, Northwestern University. Dr. Barborka received his B.S. degree from the University of Chicago, M.D. from Rush Medical College, M.S. in Medicine from the University of Minnesota and his D.Sc. from Simpson College. He is the author of numerous publications on nutrition in health and disease, with special reference to obesity, diabetes and the ketogenic diet.

MRS. THELMA PORTER-LEVIN received the B.S. degree at Michigan State College in 1921, and her M.A., University of California, 1924. She taught home economics two years at the Michigan School for Blind, Lansing, Michigan, and has been a graduate student in the Department of Home Economics, University of Chicago. Her own two children have served as subjects for her research during four successive winters.

MRS. MARY SWARTZ ROSE was a contributor to the March, 1932, JOURNAL.

IRA A. MANVILLE received the Doctor of Medicine degree in 1923 after having obtained a Master's degree in Arts. Since then he has been Associate Professor of Physiology at the University of Oregon Medical School. Part of his pedagogical work is the teaching of diet therapy to nurses and to medical students. He is a member of the American Association for the Advancement of Science and of the Society of Experimental Biology and Medicine. The following are some of his publications: Variations in the Fat-Soluble Vitamin Content of Eggs resulting from Different Methods of Preservation; A Vitamin B Deficiency manifesting itself for the First Time in the Second Generation; The Ultraviolet Component of the Sunlight of Portland, Oregon; and The Hydrogen Ion Concentration of the Gastric Juice of Fetal and Newborn White Rats. Dr. Manville served for two years as president of the Oregon State Nutrition Council. FRITZI G. CHUINARD obtained her B.S. degree at Washington State College in 1928. At present she is associated with Dr. Manville as Research Assistant in Nutrition which position she has held since the first of 1932.

PAUL E. HOWE is Consultant on Nutrition, U. S. Bureau of Prisons; Senior Biological Chemist in charge of Nutrition Investigations, Bureau of Animal Industry, U. S. Department of Agriculture; Chairman of Committee on Animal Nutrition, Division of Biology and Agriculture, National Research Council; and assistant editor in charge of biological chemistry, Chemical Abstracts. He was in charge of a nutritive survey party, in the Division of Food and Nutrition, Surgeon General's office during the War; former Assistant Professor in Biological Chemistry, Columbia University; and Associate in the Department of Animal Pathology, Rockefeller Institute. Dr. Howe is co-author with H. S. Carter and H. H. Mason of *Nutrition and Clinical Dietetics*, and has prepared many publications on nutrition in man and animals, and on the protein of the body tissues. For the last three years, in addition to his regular duties in



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The National Live Stock and Meat Board has just published a new set of six food value charts. The charts show the relative amounts of energy, protein, calcium, phosphorus, iron and copper, and vitamins contained in an average serving of many of the common foods. They have been accepted by the American Medical Association.

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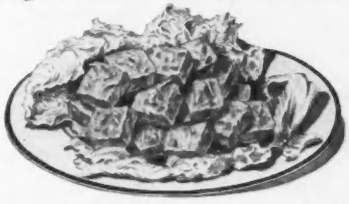

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the Bureau of Animal Industry, he has aided in the organization of methods of feeding Federal prisoners through the establishment of a basis of rationing and improvement in cookery, and has accomplished considerable saving in money, at the same time improving the diets of the prisoners.

MARGERY VAUGHN, a native of Kansas, received her Bachelor of Science degree from Battle Creek College in 1927. She was research assistant in the Nutrition Laboratory for a year or more. For a period of four years she has been assisting with the nutrition service of the American Red Cross, which organization gave her one year's leave of absence to undertake a special project in Newfoundland which is reported elsewhere in this JOURNAL. Helen S. Mitchell was a contributor to the December, 1931, JOURNAL.

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